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RICHARD P. ROTHWELL C. E., M. E., Editor.

ROSSITER W. RAYMOND, Ph. D., M. E., Special Contributor.

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ONE of the confessedly weak details of the hyposulphite lixiviation process has been the precipitation, or, more correctly, the lack of a proper method to treat the sulphides of lead, copper, iron, silver and gold produced by precipitation with alkaline sulphides, the method now in use. Refining on a cupelling hearth, the old method, which, indeed, is still in use in several mills, had the disadvantage of causing large losses of silver by volatilization in the previous roasting, and the locking up and eventual loss of a portion of the siver in slags, cupel bottoms and matte.

From 80 per cent. to 90 per cent. only of the silver charged was obtained in the shape of bars. The rest would be in the greyish black copper-lead-silver matte which would be formed early in the operation, in the pasty slags which it was impossible to do away with and, again, the precious metal had a most pernicious faculty of sinking not only into the cupel bottoms, but below, even into the iron pan, and into the surrounding brickwork. All these products had to be treated again or shipped directly to a smelter. If they were shipped, differences in assays and possible losses were bound to occur, as the products contained shot silver.

If the sulphides were charged upon the bath without undergoing a previous roasting, under the mistaken idea of preventing the loss of silver by volatilization, the same troubles were bound to occur in an even more pronounced degree. If the company shipped its sulphides direct to smelting or refining works, it avoided the great losses of this crude process, but incurred heavy expenses and discounts, amounting in the case of a Mexican mine to 10 per cent. on an average.

The acid processes of treating sulphides, one of which was invented by C. A. STETEFELDT, have not proved successes, at least commercially. STETEFELDT'S plans were ingenious, but when he came to put them into practice, the Roessler converter, for the manufacture of sulphuric acid from sulphurous acid, upon which he relied for a stock of cheap acid, as it would react upon the available sulphurous acid from the roasting of argentiferous sulphides, proved an utter failure. The cost then with purchased sulphuric acid became too high for success at the Marsac mill in Utah, although it is said that the process was a technical success.

At present interest centers upon two new processes, one of which was invented by CABELL WHITEHEAD. Whitehead's process is confined to the treatment of the sulphides as they are found in the precipitation tubs of a lixiviation plant. The details of this process as applied to this end have not been made public, but we understand that success has been experimentally demonstrated and that the refining department of the Marsac mill of the Daly Mining Company is being remodelled with a view to its adoption.

The other process aims to get at the root of the difficulty by precipitating electrolytically on zinc plates. We have not heard of any experiments being made with this method, and its success, while doubtful, must yet be proven before it is entitled to serious consideration.

THE WEST CONSOLIDATED CALIFORNIA & VIRGINIA MINING COMPANY AND THE COMSTOCK RING.

The Comstock mine and mill ring has again actuated its tool, OSCAR C. STEEL, to bring suit against its indefatigable and intrepid opponent, M. W. FOX, the plaintiff against it in the Hale & Norcross, Savage and other suits. STEEL alleges, as he has done before, that FOX, who, with others, holds a controlling interest in the West Consolidated California & Virginia Mining Company, of whose property STEEL was the original owner, has conspired to obtain control of the minority interest by hiding the existence of an alleged bonanza in the mine, and by not listing the stock on the Exchange.

It will be remembered by readers of the ENGINEERING AND MINING JOURNAL that this mine lies between the Andes and the original Consolidated California & Virginia. It was formerly thought worthless, so that when the Consolidated California & Virginia company made application for a patent it willingly omitted this ground, although it was covered by its original surveys. Explorations in the California & Virginia in 1887 and in the Andes in 1890 revealed that there was a strong probability of a large ore body being uncovered in the middle ledge.

In fact, the developments in the Andes were so satisfactory that the ring secured control of that property, which had been worked and owned by the same management as the West Consolidated California & Virginia. It did this, it is said, through STEEL, who sold out his interest, retaining, however, his minority interest in the West Consolidated California & Virginia.

After the management had changed, the ring found that by far the most promising development was in the latter mine, of which it had neglected to secure the control. It then made overtures to STEEL and succeeded in influencing him to make serious charges against the honesty of M. W. FOX. This suit, brought in 1881, is substantially the same as the new one, begun on the 21st inst.

FOX, in the meantime, acting upon information and belief, applied to a Nevada court for permission to survey the western workings of the Consolidated California & Virginia mine, as he believed that crosscuts on

the 1,100 and 1,500 ft. levels had been extended into his ground, and that the fraudulent extraction of ore was then going on. This privilege Judge RISING, whose intimate relations with the ring are matters of history, denied, stating that no evidence had been advanced entitling FOX to this investigation, although it is definitely stated by the law that such surveys can be made provided the petitioner is willing to pay the expenses.

It has never been definitely proved, therefore, by those most interested in the matter, that a *bonanza* really existed in the West Consolidated California & Virginia's ground at a depth below its present workings. The belief rested merely on suspicion and what knowledge could be gathered from the miners, but on Tuesday last Capt. SAM CURTIS, formerly superintendent of the Ophir and other mines controlled by the ring, made the positive statement in behalf of his client, nominally OSCAR C. STEEL, but the ring in reality, that a bonanza exists in this ground, to his own knowledge. If so, M. W. FOX and other stockholders are to be congratulated that the property has not yet fallen into the hands of the ring, although it is now making desperate efforts to secure it. This testimony on the part of CURTIS is tantamount to an admission on the part of the ring that its workings were extended into West Consolidated California & Virginia ground and that in all probability it had extracted a large amount of ore.

This suit has had the double object of securing possession of a coveted piece of ground and of weakening FOX in the estimation of the public. We hope for the sake of honest mining that in neither attempt will the ring be successful.

THE PRODUCTION OF LEAD IN 1892.

A clerical or typographical error (the transposition of two figures, making 178,892 read 187,892) which appeared in our remarks on page 98, of this journal of February 4th, has troubled some of our readers, who have suggested its correction. As stated, the total production of refined and soft lead in 1892 was 218,500 short tons; of this 26,734 tons from imported ores and 12,784 tons imported as bullion and refined in bond must be deducted to get the product from domestic ores—178,892 short tons. We trust our readers recognized the transparent clerical error above mentioned, the correct figures having been given for total productions and imports.

BOOKS RECEIVED.

In sending books for notice, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in another page of the Journal.

Jahrbuch der Kaiserlich-Koniglichen Geologischen Reichsanstadt. Jahrgang 1892. XLII. Band. Vienna, Austria. Published by the Imperial-Royal Printing House.

Records of the Geological Survey of New South Wales. Volume III. Part II. 1892. Sydney: Government Printers.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents

The Percentage of Iron in Magnetite.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: I have followed with interest the very learned deductions of a number of writers on the above subject, but how a specimen of Gunflint Lake magnetite could contain a high percentage of silica, besides a high percentage of metallic iron, seems a difficult problem for them to solve. It would seem that they prefer to accuse Mr. Hoffmann, the chemist who made the analysis, of not having observed the first and elementary principles of iron analysis, of having allowed the pulp to be contaminated with iron scales from his mortar and pestle than to looking for another explanation. Dr. Raymond showed them one way, but they did not profit by his remarks.

Mr. Browne, judging from the tenor of his letter, seems to me to be especially irritated, in so much that he is unaware of using the production of others in trying to correct Mr. Hoffmann. It had been of much better taste if he had omitted his supposition in regard to the mortar and pestle, as it is evident from his communications that he has not recognized the manifold different and abnormal compositions of iron ore.

The criticism of Mr. Raymond's citation of Berthier's formula of hammer scales and the former's comparison with the iron ore in question, is simply a misinterpretation. If Mr. Browne had known how near correct Mr. Raymond was in his comparison, I do not think he would have written his letter, or would have directed his attention to finding a formula, for which he had no basis, through not knowing the nature of the ore. Nobody can blame Mr. Hoffmann that he permitted the analysis to pass without comment, for the simple reason, that it is no rare occurrence in this country that we receive such ores for analysis.

Now I shall point out few possibilities how an ore like the one in question could occur.

In our district as in many other localities where younger formations are wanting, it can be seen plainly how active the plutonic forces had been in the later part of the Archaen and Cambrian periods. The lower Laurentian Gneisses have been injected into the older overlaying Huronian rocks. Intrusive granites protruded through these rocks, covering larger and smaller areas and overflowing in bosslike form the surrounding rocks of other formations. Later on irruptions of trap rocks took place, cutting the Archean and Cambrian rocks, and covering the latter formation in our district completely by overflowing it in a thickness of hundreds of feet. Now if we consider that the formation of iron beds and deposit dates almost exclusively in our region from the later Archean age, the Huronian, which therefore was called by few writers the "Iron Age," and if we further consider that a number of eruptions, especially the one after the close of the Cambrian period, took place after the formation of the iron deposits, and that during this time the iron was subjected to an immense heat and pressure, it is easily understood that the composition of the iron ore was changed considerably and therefore it is easily comprehensible, that we still find the composition of the ore quite often abnormal to the ideal formula FeO, Fe_2O_3. It is also no rare occurrence to find an iron ore high in metallic iron and also high in silica. I know a number of places in our district where diabase overflows cover the flat lying banded chert, in which pockets or layers of a high grade magnetite are imbedded. Now it is not easy to understand how an ore-bed, covered by a mass of rock, which pours forth an immense heat is converted into almost a metal, or if the heat was not sufficient to eliminate all the oxygen, how it acquired a composition similiar to that of hammer scale. The same conditions will be found in the neighborhood of intrusive rocks. The ore near the greenstone dike forming one wall of the iron bed is usually much more magnetic and of higher grade than the ore on the opposite wall composed of quartzite or other rocks. Forest fires are another source of the occurrence of such specimens. Of course we more frequently receive magnetite ores from the prospectors or mines which have undergone alteration; some of the metallic particles are oxidized again or the ferrous oxide is in a state of higher oxidation and for this reason such abnomal specimens as that from Gunflint Lake are not met with so frequently, especially not in regions where the plutonic forces were less active.

PORT ARTHUR, Feb. 18, 1893. F. HILLE.

The Algoma Nickel Mines.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: We note you have published our letter contradicting the report "that the courts had closed our mines," and that you add a remark which is capable of being so construed as to raise a question whether your correspondent or we are correct. As this report is totally untrue we do not propose to allow it to exist with the slightest semblance of truth, so we respectfully request that you will ask your correspondent to either prove it or inform you for publication that it is false, as he will have to do when he investigates the matter as carefully as he should have investigated it before sending it to you. That our three mines and smelters have shut down for a time is true, the reason for this being that we have accumulated so large a stock of ore and matte and our capacity for mining and smelting is so large that we are not compelled to run our works continually, and not for the reason given by him. No one has asked for the closing of the works in the pending litigation, and such litigation can in no way bring about such a result, neither has it affected us in any manner whatever. Our shipments of matte from Sudbury, and copper-nickel alloy and refined nickel from the works here, continue. Yours very truly,

CLEVELAND, O., Feb. 15. H. P. MCINTOSH.

[Our first, though erroneous, impression from the company's letter was that the works were not closed, an impression other of our readers also obtained, and not as to the cause of closing. This letter clearly states the real cause.—Ed. E. & M. J.

The Dix Island Granite Works.—The granite quarries at Dix Island, Me., which have been idle for some years, have now passed under control of the estate of Horace Beals; the property is to be put in order and worked regularly on some new contracts. These quarries furnished the stone for the Treasury building at Washington, the post-offices at New York and Philadelphia, and many other large buildings.

The First Gold Crusher in Nova Scotia.—At the last meeting of the Mining Society of Nova Scotia, it was stated that the first crushing machine used for gold ore in the province was at Chizzetcook, and it was resolved to have the old machine taken from its present place and set up in the Public Gardens at Halifax as a memorial. The first method of extracting gold from quartz was at Mooseland, where a hole was formed in the ledge rock and the quartz was crushed with a pestle. The first mill was set up at Mooseland, was taken a few years later to Tangier, and still later to Chizzetcook, where it is now standing, but not in use.

The Relative Corrodibility of Pure and Alloyed Lead.—The disputed point as to whether pure or alloyed lead is best able to withstand the attacks of sulphuric acid has lately received considerable attention from Dr. Lunge. After conducting a great number of experiments with various alloys, he draws the following conclusions: 1. There is no difference in the cold between the actions of sulphuric acid on pure and antimonial lead, when the admixture of antimony does not exceed 0·2%; a lead of the following composition—Sb 1·81%, Cu 0·05%, Bi 0·01%, Fe 0·01%, Sn 0·04%. As 0·10%—was more strongly attacked than pure lead, in contrast to the generally supposition that antimonial lead is more able to withstand the attacks of sulphuric acid; when the acid is warm, the difference in favor of pure lead is more marked. 2. The action of nitrous vitriol is in all cases stronger when air has access than when not; and is always greater than pure vitriol. 3. The addition of a small percentage of copper to the lead does not increase its power to resist the attacks of sulphuric acid when the temperature is below 200°C; when the temperature is above 200°C the addition of 0·1 to 0·2% of copper is advisable, though its effect is not very marked.

THE PRODUCTION OF THE PRECIOUS METALS IN 1892.

Director of the Mint's Report.

GOLD AND SILVER.

Mr. E. O. Leech, Director of the Mint, has transmitted to Congress a report on the production of the precious metals, covering the calendar year 1892, of which the following is a synopsis:

The value of the gold product from the mines of the United States was approximately $33,000,000, about corresponding to the average product of recent years, being slightly less than the product in 1891 and somewhat larger than the product of the two prior years.

The product of silver from our own mines is placed at 58,000,000 oz., of the commercial value, at the average price of silver during the year, of $50,750,000, and of the coining value in silver dollars of $74,989,900. This is a falling off of 330,000 oz. from the product of the preceding year.

The Director reports that there was a diminished silver product in each producing State and Territory of the United States, except in Montana and Colorado, the two large silver producing sections. In the former the product increased about 1,000,000 oz. over 1891. In Colorado the returns show an increased silver product of 3,000,000 oz. The largest falling off was in the States of Nevada and Idaho and the Territory of Utah. In Nevada the silver product fell from 3,500,000 oz. in 1891 to 2,244,000 in 1892; in Idaho from 4,035,000 oz. in 1891 to 3,164,000 in 1892, and in Utah from 8,750,000 in 1891 to about 8,000,000 in 1892. Of the silver product of the United States, about 26,423,000 oz. were extracted from milling ores (silver ores proper), about 24,733,000 oz. from lead ores, and about 6,844,000 from copper ores.

The value of the gold received at the mints during the year was $49,888,733, which was a falling off of $21,026,899 from the deposits of the preceding year.

The amount of silver purchased by the government during the year, under the mandatory provisions of the act of July 14, 1890, was 54,129,727 fine ounces, costing $47,394,291, an average of 87½ cents per ounce. From this silver 6,333,245 silver dollars were coined during the year. The total amount of silver purchased under the act of 1890 to December 31st, 1892, aggregates 129,779,322 fine ounces, costing $124,652,429, an average of 96 cents per fine ounce. Of this, 102,947,064 ounces, costing $96,499, remains in the Treasury in bars.

The Director recapitulates the purchases of silver by the government since February 12th, 1873, as follows:

Act authorizing:	Fine ounces.	Cost.	Average price.
February 12th, 1873	5,431,282	$7,152,561	$1.314
January 14th, 1875	31,603,906	37,571,148	1.189
February 28th, 1878	291,202,019	308,199,262	1.058
July 14th, 1890	129,779,322	124,652,429	0.96
Totals	458,109,529	$477,575,4 3	$1.0425

COURSE OF SILVER.

The course of silver during the calendar year 1892 was almost continuously downward, reaching during the year the lowest price on record.

The highest quotation was at the commencement of the year, $0.959 per fine ounce, and the lowest August 12th, $0.83 per fine ounce, a decline during the year of nearly 13 cents an ounce.

The average price for the year was $0.875 per fine ounce.

COINAGE.

The coinage of the mints for the calendar year was very large, aggregating 90,873,134 pieces, of the nominal value of $48,389,780.92, as follows:

	Pieces.	Value.
Gold	3,091,163	$31,787,222.50
Silver dollars	6,333,245	6,333,245.00
Subsidiary	32,099,252	6,307,833.00
Minor	49,349,474	961,480.42
Totals	90,873,134	$48,389,780.92

The coinage of the year included 950,000 Columbian half-dollars.

In addition to the coinage, gold and silver bars were manufactured as follows: Gold, $23,290,637; silver, $7,391,296.

Gold bars were exchanged for gold coin, for use in the industrial arts, during the year of the value of $8,739,184.

IMPORTS AND EXPORTS.

The imports of gold aggregated $18,165,056, and the exports $76,735,592; a net loss of gold of $58,570,536.

The silver imports aggregated $31,450,968, and the exports, $37,541,301, an excess of silver exports of $6,090,333.

MOVEMENT OF GOLD FROM THE UNITED STATES.

The Director reviews the recent movements of gold from the United States, commencing in May, 1888. During the last year—that is, from February 19th, 1892, when the last movement commenced, to February 15th, 1893, the export of gold from the port of New York has aggregated $90,728,839.

GOLD AND SILVER USED IN THE INDUSTRIAL ARTS.

The amount of gold used in the industrial arts in the United States during the last calendar year was $19,329,000, of which $10,588,703 was new bullion.

The amount of silver used was $9,350,000 (coining value), of which $7,204,210 (coining value) represented new bullion.

STOCK OF MONEY IN THE UNITED STATES.

The total metallic stock on January 1st, 1893, was estimated to have been: Gold, $649,788,020; silver, $593,365,365; total, $1,243,153,385.

The stock of gold in the United States fell off during the last calendar year $39,000,000, while the stock of silver increased $46,000,000.

The amount of money in circulation (exclusive of the amount in the Treasury) was $1,611,321,753 on January 1st, 1893, an increase of $18,928,124 during the year.

WORLD'S PRODUCT OF GOLD AND SILVER.

The report presents the revised tables of the product of gold and silver in the world for the last three calendar years as follows:

	Gold. Value.	Silver. Fine ounces.
1890	$113,119,600	133,212,600
1891	118,316,850	144,463,201
1892	130,417,050	152,119,300

There was an increase of over $12,000,000 in the gold product of the world during the last calendar year.

Of this increase $2,500,000 was from Australia and over $9,000,000 from South Africa.

The product of gold in Australia during the last calendar year aggregated $33,870,000, against $33,000,000 in this country, while the product of South Africa aggregated $23,293,000, placing this country ahead of Russia as a gold producer and second only to the United States and Australia.

In conformity with the criticisms of Professor Suess, Dr. Soetbeer and other eminent statisticians, the product of gold credited China annually in the reports of the Mint Bureau has been eliminated, as there is no evidence of any gold product in that empire.

The estimates heretofore allowed have been based upon the exports of gold from China annually to London and British India.

The total silver product in the world increased during the last calendar year about 7,650,000 oz., occasioned by an increase of 4,600,000 oz. in the product of the Mexican mines and 3,400,000 in the product of the mines of Australia.

Notwithstanding the strike of four months in the mines of the Barrier Range, the product of silver in Australasia aggregated during the last calendar year 13,439,000 oz.

Mr. Ottomar Haupt, official statistician to the Brussels Monetary Conference, estimates the production and consumption of silver during 1892 as follows: Consumption in kilos of fine silver: American purchases, 1,680,000; shipments to the East, 1,930,000; coinages in Europe, 213,000; coinages in Japan, 230,000; coinages in other countries, 52,000; balance remaining in Mexico, 75,000; total, 4,180,000; add industrial consumption, say, 600,000; grand total, 4,780,000. The total absorption has on former occasions been estimated by him as follows: 3,760,000 kilos for 1889, 4,270,000 kilos for 1890, 4,560,000 kilos for 1891. He estimates the production as follows: In 1892, 4,700,000 kilograms of fine silver; in 1891, 4,460,000 kilograms of fine silver; in 1890, 4,180,000 kilograms of fine silver; in 1889, 3,900,000 kilograms of fine silver.

Commenting on these figures, he says: "The increase in the output of the metal is continuous, as will be seen from the foregoing figures, and there is nothing to indicate that the low market price has anything to do with it. On the contrary, it seems that the more silver falls, the greater becomes the production. This is a very serious state of things, and renders it very difficult to understand the laissez-aller policy of the British Government with regard to India."

[In this abstract the Director of the Mint has not explained, as he did a few days ago to a representative of the Engineering and Mining Journal, that his estimates of silver production this year are based on the reports of his mint agents, and not as formerly on the returns of the refiners; and that his estimate of production is intended to represent the amount produced *by the mines* in 1892, and not the amount put in final marketable form by the refiners. The Director of the Mint admits that the production of refined silver of domestic origin was much greater in 1892 than in 1891, but since stocks in ores and base bullion have been reduced he counts the production of our mines to have been only 58,000,000 oz.

We have received checked and confirmed reports from all the refiners, and adding this to the silver exported in ores and matte, and to the deposits of unrefined silver at the mints, we get a total of refined silver produced from domestic ores exceeding by many million ounces the estimates the Director of the Mint has made of the output of the mines during the past year. We shall publish these figures next week. We do not in this question the accuracy of the Director's estimate that the mines actually produced only 58,000,000 oz., but estimated in the manner heretofore used by the mint, the production of refined silver largely increased last year.—Ed. E. & M. J.]

Steel Ties in India.—On the new East Coast Railway in India some steel ties were laid down, but it has been decided to replace them, on account of the very rapid corrosion due to the excessive moisture of the climate. All ties for this line hereafter are to be of pine, treated by the creosote process.

Paku Petroleum Industry.—Overproduction and the consequent lowering of prices have, according to the "Deutsches Handels Archiv," caused several producers to suspend operations. The yield during the past year has been unusually large and much petroleum has gone to waste. Prices are very much lower than one year ago; for instance crude oil has fallen from 11 or 10 cents per poud (36 lbs.) to 4 or 5 cents. At present refined oil is worth about 35 cents per poud.

Coast and Geodetic Survey.—The report of the superintendent of the fiscal year 1892 shows that 85 field parties were actively employed upon the coasts of the Atlantic, the Gulf of Mexico, the Pacific Ocean and Bering Sea, and in the interior. As instances of important work we may mention the continuation of the surveys of the lakes forming our northeastern boundry, the advance toward a junction in Colorado of the transcontinental triangulation survey, and the completion of the observations for the variations of latitude at three widely separated stations in co-operation with the work of the International Geodetic Association.

THE MONTREAL MEETING OF THE AMERICAN INSTITUTE OF MINING ENGINEERS.

Special Report of the Engineering and Mining Journal.

This has been a great week in Montreal. The General Mining Association of the Province of Quebec had invited the members of the Mining Society of Nova Scotia, the Asbestos Club, the Provincial Mining Association of Ontario, the Canadian Society of Civil Engineers, and the American Institute of Mining Engineers to come together and talk over twice as many things as there are letters in the alphabet. Mr. B. T. A. Bell, of the "Mining Review," who has been in charge of the local arrangements, believes that fully 600 people came and had a good time.

On Tuesday 64 guests registered at headquarters, the Windsor Hotel, and of these 36 were from the United States, 26 from Canada and Nova Scotia, and 2 from England.

Following is a complete list of those who registered at headquarters up to Tuesday evening:

Robert Allison, Port Carbon, Pa.; B. T. A. Bell, "Canadian Mining Review," Ottawa; F. S. Barnard, M. P., Victoria; H. A. Boyd, Buffalo; T. A. Blake, New York; Wm. P. Blake, New Haven; Edw. Barnes, Sunderland, Eng.; A. Blue, Toronto; John Blue, Eustis; F. P. Buck, Sherbrooke; John Birkinbine, President American Institute of Mining Engineers, Philadelphia; Geo. T. Barnes, Philadelphia; Richard Peters, Jr., Philadelphia; G. A. Bell, Troy; J. N. Conyngham, Wilkes-Barre; J. Raymond Claghorn, Philadelphia; C. R. Claghorn, Philadelphia; Wm. S. de Camp, New York; David T. Day, Washington; T. Egleston, New York; L. W. Francis, Port Henry; J. Lynwood Garrison, Philadelphia; H. M. Howe, Boston; Samuel Hinch, Scranton; E. B. Haycock, Scranton; O. M. Harris, Montreal; John B. Hammond, Sudbury; Edwin Hanson, Montreal; Wm. Hooper, Ticonderoga; J. F. Higginson, Buckingham; J. W. Hegeler, La Salle; W. H. Irwin, Montreal; Geo. Irvine, Thetford; A. L. Inman, Plattsburgh; W. H. Jeffery, Danville; John T. Jones, Iron Mountain; C. H. Johnson, Cecil Johnstone, Scarboro, Eng.; T. M. Kirkwood, Sudbury; L. A. Kilgin, Black Lake; R. G. Leckie, Londonderry; Frank Lyman, Brooklyn; G. H. Lennon, Sudbury; Stuart Lindsley, Orange; A. E. Lehman, Philadelphia; W. H. Lynch, Kootenay; G. C. Leonard, Albany; W. B. Moore, New Glasgow; Thos. Montague, Crown Point; G. R. Mickle, Sudbury; Philip W. Moen, Worcester; Alex. McDonald, St. Johns; John McKay, Sault Ste. Marie; R. McConnell, Mattawa; H. McCormick, Jr., Harrisburg; Jas. MacNaughton, Albany; J. P. Pardee, Stanhope; Wm. B. Phillips, "Engineering and Mining Journal," New York; M. Penhall, Black Lake; F. Proudfoot, Winnipeg; S. M. Pitman, Philadelphia; Jno. J. Penhall, Black Lake; J. W. Pullman, Philadelphia; R. W. Raymond, Secretary American Institute Mining Engineers, New York; A. J. Rossie, New York; Robert H. Richards, Boston; W. M. Ramsay, Montreal; A. W. Stevenson, Montreal; W. L. Scaife, Pittsburg; S. T. Swineford, Buffalo; H. See, New York; G. R. Smith, Thetford; A. R. Selwyn, Ottawa; T. W. Sprague, Boston; J. C. Smock, Trenton; F. D. Taylor, Montreal; H. G. Torrey, J. G. Torrey, New Jersey; C. H. Taylor, Chas. Taylor, Montreal; E. B. Toedt, Albany; Thos. Watson, Montreal; H. W. Winchell, Minneapolis; William H. Wiley, New York; H. J. Williams, Thetford; S. T. Wellman, Thurlow.

The Governor-General of the Dominion was prevented by the serious illness of a member of his family from opening the Convention Tuesday evening, as was expected, and the Premier of Nova Scotia, who consented to act in his place, was detained by stress of weather. So the Mayor of Montreal, A. Despardius, welcomed the guests in a very neat speech, which was replied to by R. W. Raymond, Secretary of the American Institute of Mining Engineers, in a happy manner. Mr. John Birkinbine, President of the Institute, then delivered his address on "The Development of Technical Societies," dealing with the technical history of the Institute, and pointing out in a striking manner the immense progress that has been made in the United States since the Institute was organized, twenty-two years ago. It is not too much to claim, he said, that it has been largely instrumental in bringing these great changes to pass. Patient research, careful metallurgical and mining work, and above all a spirit of generous rivalry among its members have fostered the spirit of American progress until we can now look forward to entering, at no late day, upon the rich harvest of so much painful sowing.

WEDNESDAY'S PROCEEDINGS.

At 10:15 Wednesday morning the 64th meeting of the Institute began in formal session in Room A, Physics Hall, of McGill University. President John Birkinbine called the meeting to order, and Secretary R. W. Raymond read his annual report. He stated that there was a total membership of 2,376, divided as follows: Honorary members, 15; foreign members, 38; members, 2,136; associates, 187. The total receipts were $26,595, and disbursements, $23,131; leaving a balance of $3,483. The $4,000 to be raised by the Institute for the Chicago meeting, during the week beginning July 31st, was reported as already subscribed. This was the amount assessed against the Institute for the General Fund contributed by all the engineering societies. But the Institute had only $160 subscribed for carrying on its own meeting at Chicago, and the treasurer will be glad to hear from every member, so that the Institute may have to its own credit a sum sufficient to maintain its dignity. This is a very important matter, and members are earnestly requested to give it their immediate attention and their cash.

The first paper of the meeting was that of Major J. W. Powell, Director of the United States Geological Survey, on "The Geologic Map of the United States." In the absence of Major Powell, the paper was read by Mr. Hayes, of the Survey.

It was discussed by Mr. Selwyn, of the Canadian Geological Survey; Wm. P. Blake, of New Haven; and Dr. R. W. Raymond and Dr. David T. Day, of the United States Geological Survey.

The main points brought out by the discussion were:

1. The United States Geological Survey had adopted a system of colors and names that was not in use by other great surveys, even where the end to be gained was practically the same.

2. That it had taken this action in advance of the report of the Committee of the International Geological Congress to consider names and colors.

3. That in some instances it had changed names of formations that had been in common use for many years and to which was attached a definite meaning well understood, as for instance the Archaean, which the United States Survey has changed to Algonquin.

Major Powell's paper was a carefully prepared account of the mapping work of the Survey, and showed the immense task which had been undertaken and how well on the whole it had been done. Very few people realize the extent of the United States, and the diversity of geological features, and the immense work the Survey has undertaken.

Mr. F. Lynwood Garrison, of Philadelphia, then read his paper on "The Greene-Wahl Process for Manufacturing Manganese and Alloys of Manganese Free from Carbon." This valuable contribution to the solution of a difficult question was discussed by H. M. Howe, Boston; Dr. R. W. Raymond and Wm. B. Phillips, of the Engineering and Mining Journal, New York.

The feasibility of the process seems to depend very largely upon the price of aluminum, and, while Dr. Phillips said he did not think that aluminum was now made at less than 30 cents to 35 cents per pound, Dr. Raymond said he thought it might be shown, before long, that it could be made for 20 cents per pound.

THE GREENE-WAHL PROCESS FOR MANUFACTURING MANGANESE AND ALLOYS OF MANGANESE FREE FROM CARBON: BY F. LYNWOOD GARRISON.

The great objection to the use of ferro-manganese in the manufacture of steel has been its invariable association with considerable quantities of carbon, causing, when it is added to a low carbon steel to produce manganese-steel, a hardening of the steel, whatever may be the action of the manganese. There would seem to be commercial advantages in producing a ferro-manganese free from carbon, so that the steel to which it was added would receive the beneficial effect of the manganese without the carbon contents being increased. Mr. Garrison believes the question of producing a ferro-manganese free from carbon to be solved by Messrs. Greene and Wahl.

The first attempt to produce metallic manganese in considerable quantities seems to have been made by Hugo Tamm in 1872. Native dioxide of manganese was heated with powdered charcoal or lampblack and oil in the presence of a powdered silicious and fluorspar flux. The manganese obtained having contained an appreciable amount of carbon, Tamm made attempts to remove this by fusing the metal under a layer of manganese carbonate. Tamm claimed to have made a metal having the composition: Manganese, 96·9; Fe, 1·05; carbon, 0·95, and other elements, 0·10, from a pyrolusite containing 50·5% manganese and 3·5% iron. The resultant metal, after refining this product under the fused coating of manganese carbonate, contained: Mn, 99·91; C, 0·025; Si, 0·015; Fe, 0·05. These results have not been confirmed, however, by later experimenters, and they are doubted. Messrs. Greene and Wahl's first experiments were made for the purpose of testing the correctness of Tamm's assertions, but were unsuccessful in decarbonizing the metal to any extent. They then became convinced that the first step in such a process should be the removal of the iron combined with the manganese. After abandoning magnetic and electrochemical methods, they found that nearly all the iron of rich manganese ore could be removed by digesting the pulverized ore with 30% sulphuric acid, the manganese remaining practically unaffected. The percentage of iron can be reduced from 5 or 6% to a few tenths in a few hours, and the waste acid can be utilized in making ferrous sulphate.

The reduction of the purified ore then became a puzzling problem; it was found impossible to produce manganese containing less than 6% carbon by reduction with carbon, and this high percentage of carbon could not be removed in the later operations by fusion with an oxidizing agent. Messrs. Greene and Wahl believe that a complete reduction of any manganese oxide by carbon yields, not a manganese, but a carbide having the definite form Mn_3C. For this reason manganese free from carbon cannot be reduced in the electrical furnace or in graphite crucibles. Experiments with the electrolysis of the fused baths of manganese chloride and manganese fluoride were futile, and it became evident that a reduction, in the entire absence of carbon, was necessary for the solution of the problem. Moreover, the compound to be reduced should be one of the oxides of manganese, as the use of halogen compounds on a commercial scale and the reduction by sodium were precluded by reason of the cost of their manufacture.

Messrs. Greene and Wahl, having determined that the reduction by means of metallic aluminum, which had been barely experimented with by Michel, Wohler, Levy, and Langley, was the proper method, they soon found that neither clay nor graphite crucibles could be used in the operation—the graphite for reasons mentioned before, and the clay because of the energetic action of the aluminum upon the silica; experiments yielding a silicious manganese containing in some instances as high as 12% silicon. Calcined magnesite, however, was found to answer the purpose, and a graphite crucible lined with this afforded excellent results. In producing this pure manganese, the manganese dioxide is reduced to monoxide by heating in a stream of reducing gas. It is then mixed with granulated aluminum and with a flux of lime and fluorspar. The mixture is then placed in the magnesite-lined black-lead crucible and placed in a furnace commonly employed in melting brass. When the contents have reached a bright red, the aluminum begins its energetic reducing action upon the manganese monoxide, and in a few minutes the reaction is complete. The heat liberated liquefies the contents of the crucible and brings them to a white heat. The inventors state that they have obtained a yield as high as 2·84 parts of manganese per unit of aluminum, equal to 94·5% of the theoretical yield. The following is the reaction that occurs:

$$Al_2 + MnO = Al_2O_3 + 3\,Mn.$$

The metal obtained is dense and homogeneous, with a steel-gray color and a pinkish to reddish bronze tint. It is hard and brittle, having an irregular fracture. The specific gravity varies between 7·26 and 7·38, or 7·32 on an average. Its average composition is Mn, 96·5; Fe, 2; Si, 15. It retains but the slightest trace of aluminum.

In operating a small plant capable of producing about 2 tons of manganese per week the inventors state that 1,560 lbs. of aluminum and 5 tons of manganese ore will be required. Basing their calculations of the present market value of aluminum at 55c. per pound and manganese ore at $40 per ton they find that the manganese will cost about $7.60 per long ton, or about 34 cents per pound.

As yet the process has been conducted on a laboratory scale only, but it would seem to have many possibilities.

The third paper was by Wm. P. Blake, and was a combination of three papers, to wit.: "The Lead-Zinc Deposits of Southwestern Wisconsin," "The Separation of Pyrite from Lead-Zinc Ores," and "A Furnace for Roasting Lead-Zinc Ores." Mr. Blake gave one of his clear, concise "chalk talks" on the blackboard, sketching the new "terrace furnace" he had devised for the roasting of these ores with accession of superheated air. To bring these ores down so that they shall not contain over 2% of lead nor over 4% of iron is certainly a good showing. The terrace furnace is so arranged that the ore is fed at the top and is scraped by stationary ploughs onto each succeeding terrace, the furnace revolving at the rate of 10 revolutions per hour. This slow rate is necessary to a thorough roasting of the material, and the prevention of even incipient fusion.

The paper was discussed briefly by Dr. Raymond and Mr. Penhale. The meeting then adjourned till 3 P. M.

The first paper of the afternoon session was by Prof. Robt. H. Richards, of the Massachusetts Institute of Technology, Boston, on "A New Prismatic Stadia Telescope and Self-Reading Rod," which has already been illustrated in this journal May 14th, 1892.

The new prismatic stadia telescope, with the self-reading rod which must be made to meet the requirements of the instrument, is one of the most ingenious and useful of the latter day labor saving appliances. By its means additional accuracy is assured, and the elimination, to a great extent, of the personal equation of error. It is certainly to be commended to all those who have much work involving the use of stadia measurements.

The two papers that followed that of Prof. Richards were of great importance; that of A. J. Rossi, New York, on "Titaniferous Ores in the Blast Furnace," an abstract of which follows, and the paper of H. V. Winchell and J. T. Jones on "The Biwabik Iron Mine, Mesaba Range, Minnesota." The discussion of Mr. Rossi's paper was quite brief, as might have been expected, for it deals with the vexata questio of American blast furnace practice, viz., the use of titaniferous iron ores. So radical is the departure made by Mr. Rossi that members who fancied they knew something about the use of such ores were not prepared to take part in the elucidation of the problem. The fact is that Mr. Rossi has boldly thrown his gauntlet into the arena, and it lies there at the disposal of any knight who may see fit to pick it up. We do not go too far in saying that this paper marks a distinct and valuable epoch in the manufacture of pig iron in this country.

TITANIFEROUS ORES IN THE BLAST FURNACE. BY AUGUSTE J. ROSSI, NEW YORK.

Mr. Rossi's paper is of unusual interest and importance. After describing, at some length, what was perhaps the first successful use of titaniferous ores with 18 to 20% TiO_2 in this country, by the Adirondack Iron & Steel Co. between 1848 and 1852, he proceeds to a general discussion of the use of such ores in more modern practice.

It is, of course, well known that they have been used in Sweden for a long time, and Swedish ironmasters have more than once expressed their surprise at the manifest reluctance of other smelters to employ this class of ore.

Titaniferous ore yields a most excellent iron, and the general absence of deleterious amounts of phosphorus renders it suitable for steel making. Indeed, such ore has been considered an antidote for cold-shortness.

Mr. Rossi states the general objections to the use of titaniferous iron ore under three heads.

1st. The tendency toward the formation of infusible compounds of titanium, carbon and nitrogen.

2d. The refractory character of the ore, necessitating a greater consumption of fuel and a higher temperature.

3d. The viscosity of the slags, with the danger of stoping the flushing hole.

He propounds this question: Can a slag essentially a titanate, and containing silica, if at all, only as an accessory constituent, be obtained of sufficient fusibility and fluidity for the blast furnace?

In support of the view that there are immense deposits of ore in this country that, while containing from 3% to 4% of titanic acid, are remarkably free from silica, he quotes fifteen analyses of various ores that show little or no silica and from 52% to 68% of metallic iron. Perhaps the most famous of all the beds of titaniferous ore in this country are in the Adirondacks, where enormous deposits occur, with iron from 50·15% to 65·45%, titanic acid from 10·91% to 25·78%, silica about 1%, and small quantities of alumina, lime and magnesia.

It would thus be entirely feasible to secure ore practically free from silica, and the question of fluidity of slag would rest with the possibility of slagging the titanic acid. "Multiple silicates are known to be more fusible than single or double silicates. May not the same rule prevail for titanates? If such fusible compounds could be obtained, independently of any silica, by means of predominant multiple titanates in a slag, the addition of an extra silica-bearing element in the blast furnace would become unnecessary, and the quantity of flux would be reduced correspondingly. The limestone of a dolomite would furnish both MgO and CaO to the slag. Some silica would necessarily find its way into the slag, since the ore, stone and fuel (and we might add, the lining) would contribute both silica and alumina. But the amount of SO_2 being too small in any case to satisfy the affinities of the bases, could not titanic acid supply the acid element?"

In other words, as we add lime and magnesia to slag off the silica that is in ordinary iron ores can we not in some way cause these bases to unite with titanic acid in titaniferous ores, without too great an outlay for fuel or the use of an excessive temperature?

In the elucidation of this question Mr. Rossi has performed a large number of experiments, and has even gone so far as to build a little blast furnace at Perth Amboy, the hearth of which held about 160 lbs.

The space at our disposal will not allow a detailed account of his work. Suffice it to say that his views seem to be borne out by the experiments, and that under proper conditions of burden, blast and temperature it will be possible to get rid of titanic acid. Whether these results will be substantiated by actual practice on a large scale remains to be seen, but our opinion is decidedly of this nature, and we believe that these ores can be profitably treated.

In view of the wonderful developments in the Mesaba Range, it behooves Eastern ironmasters to look well to the foundations of their gigantic structure. If titaniferous ores can be cheaply mined and smelted, there appears to be no practical limit to the amount that may be obtained, especially in New York and North Carolina. It remains, however, to be shown on a commercial scale that Mr. Rossi's results can be uniformly obtained, and the owners of large deposits of titaniferous ores could not do better than to arrange for such a test. The cost of it would be inconsiderable when compared with the possible and probable value of the results. The third and last paper of the afternoon session was that by Messrs. Winchell and Jones, on the Biwabik mine. It was beautifully illustrated by several large drawings. The ore body is half a mile long, nearly a quarter of a mile wide, and of a thickness to 100 ft. It has been prospected by 23 shafts in ore, one drift or level extended to a distance of 50 ft. south, and one drift 150 ft. to the northeast from pit No. 15, and several drill holes from the bottom of the shafts. The cubic contents of the deposit are given as 247,155,000 ft., or, taking 11·9 cu. ft. to the ton, 20,769,329 tons. The average analysis of each grade of ore is given as: No. 1, iron, 60·04; phosphorus, 0·026; No. 2, iron, 63·86; phosphorus, 0·033; No. 3, iron, 63·94; phosphorus, 0·059; No. 4, iron, 62·08; phosphorus, 0·040; No. 5, iron, 61·60; phosphorus, 0·075; No. 6, iron, 54·59; phosphorus, 0·082.

The amount of stripping to be done is 2,893,333 cu. yds., and the open pit, steam shovel system will be adopted for mining the ore. So far the Biwabik company has expended over $60,000, without shipping a ton of ore.

Attention is called to the fact that there is no hanging wall to this ore body, and any method of underground mining must take into account the new problems presented in mining a flat deposit of great thickness without a solid roof. But after long deliberation the open pit system was adopted, and will be prosecuted. The mine is tapped by the Duluth & Iron Range and the Duluth, Mesaba & Northern railways.

Discussion of the paper was postponed. Dr. Raymond, however, remarked that the Biwabik was only one of several great companies in the Mesaba, and that the contemplation of this fact tended to make a Lehigh Valley man sick, and Dr. Phillips, saying that the Alabama folks would also not feel particularly well. With the development of the Wyoming, and particularly of the Montana coalfields, the future of the Northwest as an iron and steel district is exceedingly bright.

The meeting adjourned to 10 A. M., February 23d, and announcement was made that the Institute was invited to a snowshoe reception by the Montreal and St. George Snowshoe Club at 8 P. M.

THURSDAY'S PROCEEDINGS.

Thursday morning the meeting of the Institute was continued, and a number of papers, abstracts of which are here presented, were read. The Canadian Asbestos Club held its meeting also, and in the afternoon the Canadian mining societies with the Institute met in joint session, which was continued in the evening and on Friday morning. The chief purpose in holding the united conventions was to secure the opinions of as many engineers as possible in regard to legislation affecting the mining industry of Canada. The resolutions and papers introduced dealt mostly with the question of bonuses to the producers of pig iron, the free admission of all mining machinery of a class not manufactured in Canada, the expediency of levying an export tax on natural gas, and the free importation of blast furnace and metallurgical fuel. They also take up the question of enlarging and beautifying the great collections of the Geological and Natural History Survey of Canada, and the publication of governmental reports.

EXCURSIONS.

Friday afternoon the members and ladies, who accepted the invitation of the Canadian Society of Civil Engineers, enjoyed an excursion by rail to the Victoria and Lachine railway bridges over the St. Lawrence River. In the evening the guests had to make a difficult choice between a fancy dress skating carnival, given by the Victoria Skating Club, and an interesting, if somewhat less brilliant, conversazione, given by the Governors of McGill University in honor of the official opening of the new engineering buildings.

To-day there will be an excursion to Radnor Forges, Quebec, and a visit to the works of the Canada Iron Furnace Company, Limited, which operates an extensive area of bog iron ores. These works are notable as being among the oldest on the Continent, iron having been made and shipped so far back as the 16th century.

PAPERS PRESENTED.

We give below abstracts of a number of the more important papers read at this meeting:

THE PHOSPHATE MINES OF CANADA. BY H. B. SMALL.

The deposits of apatite in Quebec are confined to a district of limited extent, in the townships of Templeton, Wakefield, Bowman, Derry, Portland, and Buckingham, north of Ottawa and lying between the Gatineau and Lievre Rivers. The Montreal & Ottawa Division of the Canadian Pacific Railway runs along the river front of these townships, and a spur connects Buckingham village, near the mouth of the Lievre, with a station of the same name on the main line 21 miles east of Ottawa. The country rock is mostly pyroxene intermixed with

quartzite, orthoclase, mica, gneiss and crystalline limestone. The phosphate is of two distinct kinds, crystalline and massive and granular and friable. Crystals of very large size have been found, some weighing as much as 1,000 lbs. The granular phosphate is very abundant and is known locally as "sugar phosphate," and is often so disintegrated as to look like sand, and soft enough to be dug out.

Most of the large mines are on or near the Lievre, and the rock is hauled during the winter over the excellent snow roads and stocked until navigation opens in the spring.

In spite of the proximity of American markets most of the rock exported from Canada goes to England, 174,512 tons of the 208,559 tons raised between 1882 and 1890 going this way.

The production since 1878 is given below, in gross tons:

Years.	Tons.	Years.	Tons.
1878	10,743	1885	28,969
1879	8,443	1886	20,440
1880	13,060	1887	23,152
1881	11,968	1888	18,776
1882	17,153	1889	29,987
1883	19,716	1890	28,457
1884	21,709	1891	15,153

The value per ton fell from $19.36 in 1878 to $7.89 in 1891.

No deep mining is carried on outside of the Province of Quebec, but in Ontario some surface mines are worked. So far as at present known the deposits in Ontario are not as rich as the Quebec deposits.

At present there are only three fertilizer factories in Canada, situate in New Brunswick, Quebec and Ontario.

On the Lievre there are three mills for grinding phosphate, all run by water power. One of these mills belongs to the Canadian Phosphate Company, and has a daily capacity of 6 to 7 tons; another to Lomer, Rohr & Co., with a capacity of 40 to 50 tons a day; and the third, at Seabury, has a capacity of 25 tons a day.

Mr. Small presents some interesting figures showing the cost of mining and transportation. The cost per ton for mining varies from $3 to $6; transport to wharf, 1 to 5 miles, by cart 25 cents to $1.25, and over a tramway for from 1 to 2 miles, 20 cents; transport by river in barges for from 10 to 25 miles, 30 to 60 cents. Rehandling at Buckingham, 10 cents. Railway from Buckingham to Montreal, $1.25 to $1.50. Rehandling at Montreal, 25 cents. Commission, insurance, etc., 50 cents. Ocean freight varies from $1.20 to $2.88.

Putting the cost to the mouth of the Lievre at $3.50, the lowest cost given by Mr. Small, and contrasting it with $6.50, which it may reach this difference seems to us very excessive. The cost of mining alone varies from $3 to $6. There must be some thing radically wrong to allow of this variation in the same district.

He says the wages of the laborers are from $15 to $25 a month, with board; and, by the day, 90 cents to $1.25, without board, and $1.50 to $2.50 for foremen and machinists. A team and driver average $3 per day.

The total cost of mining and delivering at the mouth of the Lievre should not, in our opinion, exceed $2, and the cost, alongside, in Montreal should not exceed $2.50, instead of $4.85. If these mines are to compete with South Carolina and Florida in the open market the cost of mining and of handling must be greatly reduced.

NOTES ON EMERSON'S METHOD FOR THE DETERMINATION OF PHOSPHORUS. BY H. C. BABBITT.

As to the possibility of the "yellow precipitate" containing arsenic, Mr. Babbitt finds that if the temperature does not exceed 25° C. the arsenic does not materially affect the result. If the temperature be above this point the danger of contamination is increased. Thus at 25° C. of the arsenic added only 0·2% was thrown down; at 40° C., 7·8%; at 60° C., 12·0%, and at 85° C., 75·2%. Mr. Babbitt gives also the following analysis of phospho-ammonio, molybdate ("yellow precipitate") prepared most carefully and dried at 180 C.: $(N.H_4)_6O_3$, 4.091%; P_2O_5, 3·784%; M_0O_3, 90.315%; H_2O, 0.990.

He supposes the composition to be represented by the formula $(N.H_4)_6O_3$, 24 Mo. O_3, P_2O5, and that the ratio of phosphorus to molybdic acid is 1·794%.

From analyses quoted he observes that all of the phosphorus is precipitated at 25° C., with 5 minutes' shaking, and that the composition of the phospho-molybdate is constant, not being influenced by the presence of $Fe_2(NO_3)6$ — basic ferric nitrate.

NOTE ON UNFREEZABLE DYNAMITE, BY E. E. RUSSELL TRATMAN.

The large number of accidents resulting from attempts to thaw out dynamite cartridges when frozen make some method of prevention very desirable. An unfreezable dynamite, invented by Liebert, a German, has been used to some extent in Europe, and has been favorably reported upon by chemists and experts in explosives. The dynamite is made in the usual way, but its composition includes a chemical by which its freezing-point is lowered from 40° above to 50° below 0° F., while the explosive power is slightly increased and the sensitiveness to concussion slightly decreased. This dynamite, it is claimed, is not affected by damp; it may be kept for considerable time without deteriorating or losing its special properties, and its cost is little, if at all, in excess of that of ordinary dynamite. It is patented in the United States. Some experiments are to be made with this, and more information is promised.

NOTE ON THE COLORADO LEASING OR TRIBUTE SYSTEM, BY BENJAMIN B. LAWRENCE.

In this paper Mr. Lawrence, who is a Colorado mining man, has called the attention of managers to the system which had helped greatly to develop the mineral industry of his State. The lease system is largely in force in Clear Creek and Lane counties, and Mr. Lawrence cites an instance where the system is in operation, which we suspect to be the Colorado Central Mining Company, of Georgetown, Colo., although he does not give the name. In this mine the lessee secures a lease in level "C," we will say. He then drives the drift 100 ft. forward, paying all expenses, including hoisting and handling, himself, and when this is completed has the privilege of stoping the 100 ft. of ground to the level above, paying the company a royalty of from 25% to 33⅓% of the gross product. The amount depends upon the estimated richness of the ground. If, however, the drift should have been driven by the mine management, it paying all expenses, the lessee contracts to merely stope the exposed ore, paying from 33⅓% to 75% of the gross yield as royalty. The lessees are under full control of the mine foreman, and are subject to the usual mine regulations. The ore, which is piled in heaps belonging to individual lessees, is shipped to a sampler and the value ascertained. The royalty is then deducted, and the balance, after deducting the various items of expenses, is then credited to the lessee. Mr. Lawrence enumerates various advantages of the system which will be discussed on another page.

NOTES ON ANTHRACITE "COAL APPLES" FROM PENNSYLVANIA: BY W. S. GRESLEY.

Some remarkable specimens of spheroidal anthracite coal were recently found at the Mammoth Seam, Milnesville, Luzerne County. The "apples" vary from 10¼ in. to ¼ in. in diameter, the usual size being that of a small apple, or hen's egg.

Nine drawings are given to illustrate the paper, with several analyses. In chemical composition these "apples" do not differ essentially from ordinary anthracite coal, nor is there a difference in specific gravity or hardness. The characteristic feature of the "apples" is that the longest axis of every one lies along a bedding plane, while the shortest axis passes about at right angles to these planes. Mr. Gresley notices a hitherto undescribed form of fracture, and concludes that so far as the specimens under discussion are concerned they are not nodules, but are forms produced by some system or process of jointing, producing curved overlapping joints after the coal seams had acquired their ordinary or regular jointing. The question of the origin of these curious forms of coal is left open, although he directs attention to the experiments of Koch on the spherical shape assumed by some varieties of iron ore and by quartzite in a furnace at 1,500° C.

AN INVESTIGATION OF COALS FOR MAKING COKE IN THE SEMET-SOLVAY OVENS, WITH THE RECOVERY OF AMMONIA AND TAR, AND REMARKS ON THE SOURCES OF AMMONIA. BY J. D. PENNOCK.

The Semet-Solvay oven is to be tried in this country by the Solvay Process Company at Syracuse, as twelve have been erected and are nearly ready to begin operations. It is a recuperative oven of the closed type represented originally by the Knab oven. Others of the same kind are the Pernolet, the Simon-Carvis, and the Otto-Hoffman. This kind of coke oven differs from the Appolt and the Coppie chiefly in that the tar vapors and gases are not used as fuel for heating the retorts. At Havre, where is the largest single installation of the Semet-Solvay oven, viz. 100, the charge of coal is 4 tons to an oven, and the coke is drawn every 24 hours. The coal used contains from 16 to 17% of volatile matter, and the yield of coke is 81% of the weight of the charge, being 6,480 lbs. from each oven. As bye-products there are obtained 14 lbs. of ammonium sulphate and 31 lbs. of tar per ton of coal, or 56 lbs. of sulphate and 124 lbs. of tar per oven.

At the Brunner-Mond Soda Works, Northwich, England, the yield per ton of coal is 25 to 27 lbs. ammonium sulphate and 82 to 84 lbs. of tar.

The Semet-Solvay oven is 30 ft. long, 14 in. wide on the side of the steam ram (used for forcing out the coke), and 15 in. on the other, and is 5 ft. 8 in. high. The wall is composed of three fireclay retorts, with tongue and groove joint. The walls of the retorts are 3 in. thick, so as to permit of rapid and intense heating by the burning gas passing through the retort. It is closed at either end by an air tight door. The Otto-Hoffman oven is 30 ft. long, 2 ft. wide and 5 ft. 3 in. high, so that the Semet-Solvay has the advantage of 10 in. less width, and as the oven is practically airtight a high yield of coke is obtained.

Mr. Pennock's paper is a timely and valuable contribution to a subject which is sure to become of greater importance each year, viz., the improvement of processes for coking whereby as good a coke as the beehive is to be obtained, and in addition the recovery of useful bye-products rendered possible and profitable. It is, however, to be regretted that he has given us no information as to the cost of constructing and operating these ovens in France and England. They have not yet begun to be operated in this country, so that nothing could be said as to costs here, but it would have been a good thing to add to his paper if he could have told us what the cost abroad is. The great trouble with some recovery systems is the initial cost of erection, reaching with the Simon-Carvis system to between $800 and $1,000 per oven, nearly or quite 4 times as much as the beehive. If, however, from 31 recovery ovens, costing $1,000 each, it is possible to obtain as much coke as from 100 beehive ovens costing $250 each the difference is not very great. But in order to draw 31 ovens each day there must be at least 62, or say 65 to allow for repairs, etc., so that the expense would be $65,000 instead of $31,000, as against $25,000 for the 100 beehive ovens.

But for purposes not directly connected with the supply of fuel for blast furnaces, as for instance at Northwich and Syracuse, the employment of the recovery system has a free field.

The time is coming, as Mr. Pennock remarks, and "it will not be long before the greater part of our ammonia will be a bye-product of the coke oven instead of the gas retort."

METHOD OF PLUMBING SHAFTS, BY A. NEUSTAEDTER.

"The method consists in obtaining a longer base by suspending the plumb-lines from the extreme corners, lengthwise of the shaft, and reproducing the bearing by offset-points on sticks attached to the plumb-lines, and supported on floating corks." The idea appears to be good, and the author says that it has given him very satisfactory results, permitting the use of a base of 10½ ft. (3 compartments) or 8 ft. (2 compartments) instead of 4 ft. for vertical sighting, with or without string-base. The paper is illustrated with three drawings.

A VARIABLE SPEED PULLEY. BY H. C. SPAULDING.

A new device, invented by Mr. E. F. Gordon, of Dover, N. H., is presented here as offering many advantages over the step or cone pulley where speed adjustments of machines are required. This device consists of a narrow pulley with a deep V-shaped groove, split by a plane passing through the bottom of the groove, one of the two halves thus formed being fixed to the shaft, and the second being capable of adjustment so as to bring the faces of the groove nearer or farther apart. By the use of a narrow or round belt, and with faces having the proper angle, the working radius may be varied within wide limits, while a loose sheave may be inserted between the two pieces, thus combining the differential-speed principle with the equivalent of a tight-and-loose pulley.

In the illustration, Fig. 1, A is the shaft; B, C, are the two halves of the pulley; D, is the idler; E, the belt; F, G, hand-wheels; H, a collar, fast on the shaft. By the action of the belt, B and C tend to separate from each other; and since B is fast on the shaft, A, C (which is splined on the shaft, and hence must turn with it, although free to move along it) is forced against F. The hand-wheels, F and G, are free to turn on the shaft, but may be held at rest whenever desired. The hub of one carries a male screw, and that of the other a female, so that by altering the position of one on the other, they increase or decrease the distance between the collar, H, and the half of the pulley, C, thereby allowing C to recede to a greater or less distance from B, and

FIG. 1.

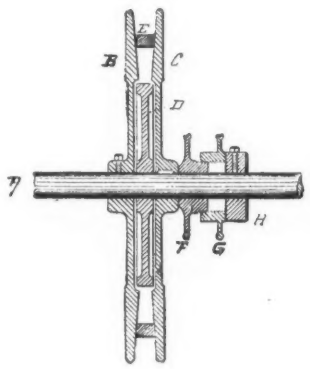
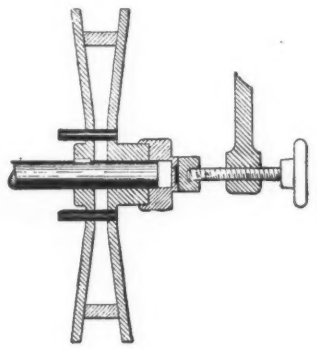


FIG. 2.



A NEW VARIABLE SPEED PULLEY.

determining the position of the belt, E, and its consequent speed relative to that of the shaft, A. It will be evident that in this construction, when used as a driving-shaft, the belt-speed will become less and less as F is screwed into C, until C has so far receded from B as to allow the belt to drop on to the idler, P, when the driven mechanism will come to a standstill, to be gradually started again by the adjustment of F and G.

Fig. 2 shows a still simpler form, applicable when the pulley is located on the end of a shaft. In this case the loose pulley is omitted, it being assumed that only a speed-adjustment is necessary, one part of the pulley being fast on the shaft, the other free, but loosely pinned to the first so as to rotate with it, and the working radius being determined by adjustment of a hand screw.

The belt may be round or nearly square in section; for most of the experiments so far made a narrow double-ply leather belt has been used, with the edge beveled to correspond with the angle of face of pulley.

The construction shown in Fig. 2 has recently been applied to the feeding-rolls of a 48-in. band re-sawing machine in a way which illustrates its simplicity and adaptation to this class of work.

Fig. 3 shows the arrangement of parts, A being the split pulley, its shaft being driven by a link-belt from a continuation of the lower band-wheel shaft, and supported by an arm, B, swinging from this as a center. The belt, C, drives the pulleys, D, D, on horizontal shafts worm-geared to the axes of the feed-rolls, the swing of the arm, B, compensating for the varying length of the belt, C, owing to changes either in position of the feed-rolls, E, with reference to the saw, or in the working-radius of A, the latter being determined by the position of a hand-screw.

The diameter of the split pulley is 12 in., the minimum working-radius 3 in., giving a linear speed to the surface of the feed-rolls of from 10 to 30 ft. per minute. A double-ply belt, 1 in. wide is used, and its power is such that if the stock be held firm, the slip occurs between it and the feed-rolls, which are four in number, all geared, 18 in. long and 3 in. diameter, and not at the belt, as is usually the case with a cone-pulley.

It will be seen that this pulley does not require parallelism of the shafts; the distance between the shafts may be varied; speed can be adjusted very closely, within certain limits; these limits may be wider than can be secured in any other way; and speed can be adjusted while under load.

NOTES ON THE GEOLOGY OF THE HALF MOON MINE, PIOCHE, NEVADA. BY ERNEST WILTSEE.

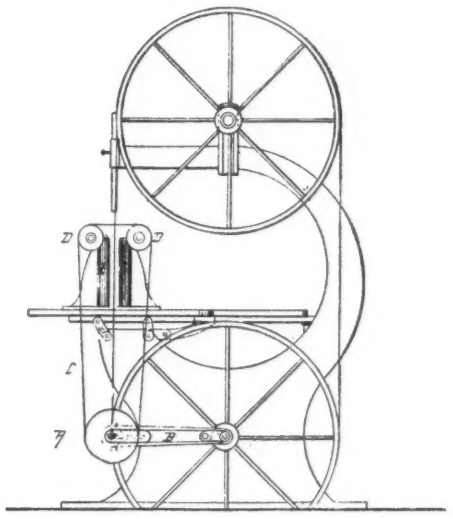
The Half Moon mine is three miles west of the town of Pioche, the county seat of Lincoln County, Nev. It lies, therefore, between the Ely Range on the north and the highland range on the south. The general formation, near Pioche, is quartzite generally overlaid by limestone and shale. At the mine, the quartzite has been denuded and the principal veins outcrop in this formation, but toward the west the quartzite is again covered with limestone, containing thin strata of shale. The first discovery of the Half Moon was upon a vein lying nearly flat, in the contact between a shale and an overlying limestone. The stratum of limestone, forming the hanging wall, is from 3 to 4 ft. thick, and at times it is replaced with manganese to such an extent as to disappear entirely.

The manganese sometimes carries 5 oz. silver per ton. Above the limestone of the hanging wall is shale of 10 to 15 ft. thickness, and then limestone to the top of the ridge.

The foot wall is shale, soft, somewhat fractured, and contains many fossils, trilobites chiefly. The shale is about 20 ft. thick, and under it is limestone for 100 to 200 ft. known thickness, and under this, again, quartzite of unknown thickness.

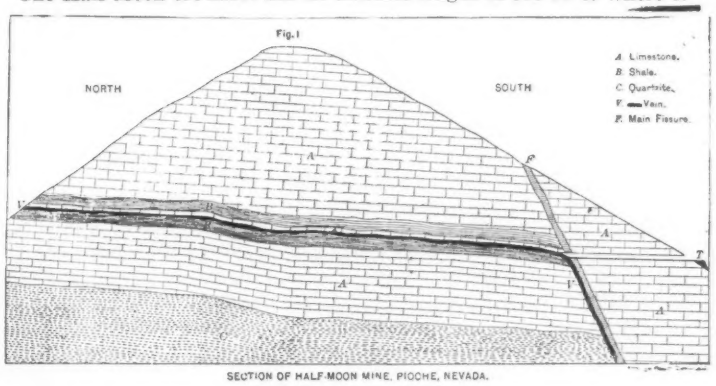
There are two veins, a flat vein and a main fissure. The flat vein dips at 5° to 10° south, is regular, well stratified and uniform in composition. The gangue is quartz, with 10% iron, and 15% lead as sulphide and carbonate and silver 23 oz. per ton. It never "pinches" and has a thickness of from 8 in. to 2 ft., averaging 16 in.

FIG. 3.



After driving on this vein for 900 ft. it was found to fall into the main fissure, which dips 60° to 70°. The flat vein turns gently and falls into the main fissure on the foot-wall side, and at the point of union carries 50 oz. of silver. The main fissure is never less than 4 ft. in width, and sometimes 20 ft., is filled to the junction with iron stained quartzose stuff and "porphyry," but contains no ore of value.

The Half Moon ore-shoot has an extreme length of 900 ft. to where it



SECTION OF HALF-MOON MINE, PIOCHE, NEVADA.

joins the main fissure. The assay of 1,560 tons of the ore gave: Lead, 15·4%; silver, 23·4, and gold, 0·442 oz. per ton. In addition there may be silica, 60; iron, 10; lime, 2½, and manganese, 2½%.

THE MINERAL RESOURCES OF SOUTHEAST ALASKA. BY G. W. GARSIDE.

The chief metalliferous belt in this field is close to the shore of the mainland, which it follows for nearly 100 miles, the outcrop on the adjoining islands being less regular and strong. The mainland zone, embracing the Sumdum, Snettisham, Grindstone Creek, Sheep Creek, Gold Creek, Lemon Creek, Montana Creek, and Berner Bay districts, contains ores of gold, silver and lead, the gold being found free and combined with pyrites.

Sumdum.—This district, 60 miles south of Juneau, was discovered in 1879, and placer mining was carried on until 1890, when quartz mining began to attract attention. The veins are generally strong, from 2 ft. to 12 ft. wide, usually between slate walls, and carry free gold as a general rule. There are ores, however, which carry a large portion of their gold in the pyrites and some whose value is entirely locked up in them. The lodes trend N. E. and S. W., and with a dip to the north-east of 80°.

Snettisham.—This district, adjoining Sumdum, has been prospected to a slight degree only, owing to lack of capital. The trend of the veins is parallel with the main belt, and the dip is 60° N. E. The country rocks are gneissoid rocks, micaceous and calcareous slates, and porphyry. The ores carry free gold and auriferous pyrites; and 15 miles from the coast rich silver ores have been discovered.

Grindstone and Sheep Creeks.—The ores and formations of these districts are similar, and while Grindstone Creek has been slightly developed, considerable work has been done on Sheep Creek. The veins here are small, carrying silver, auriferous pyrites and some galena. A 10-stamp, free-milling gold mill, erected on one of the best groups, proved a failure, as it was not calculated to treat the ores successfully. The veins strike N. W. and S. E., dipping about 80° N. E. The country rocks are the same as in the Snettisham district.

Gold Creek.—This is the most important mining district of Alaska, as it includes not only the mines in the vicinity of Juneau, but those on Douglas Island, where the Alaska Treadwell mine is situated. On the mainland, near Juneau, there are five stamp mills, all run by water power, three of which are in operation. A large amount has been produced by hydraulicking operations here, and now a long bedrock tunnel has tapped the basin. Milling operations have not been entirely successful, owing to the refractory nature of the ore.

The Treadwell mine, an immense low-grade deposit, is situated on Douglas Island, about a mile from the mainland. The width of this ore body is extraordinary, the measurement from foot to hanging wall being 42 ft. The mill has 240 stamps and 96 Frue vanners. In the annexed chlorination plant various furnaces, such as the Bruckner and Spence, have been experimented with; but the reverberatory has been found to give the best results in roasting the auriferous concentrates. The MacArthur-Forrest process has proved a failure on the pyrites, only 65% being extracted; while with chlorination, a yield of 96 to 97% is obtained.

On the Alaska-Mexican property, which adjoins the Treadwell on the southeast, a 120-stamp mill will be erected this year. Considerable development work has been carried on in the vicinity of these properties.

On Lemon Creek, operations are confined to hydraulicking, as well as on Montana Creek. The facilities for economically mining the lodes which crop out at various points in the latter district, are known to be good, and development will undoubtedly occur when a road is built to the district. The future for Berner Bay district is considered good, and considerable development work has been done, exposing large quantities of ore development in Fuimler Bay and Sitka has been retarded, but both districts are known to possess gold veins.

TESTS OF NICKEL-STEEL.

Nickel produced at the Brooklyn Nickel Works, near Cleveland, by the Canadian Company, which brings its ores from Sudbury, Ont., was tested in steel-making at the Cleveland Rolling Mill Company's works last fall. Jules Garnier, the French engineer, who has written and experimented extensively on nickel, and under whose direction the smelting works at Brooklyn were erected, has sent to "Le Genie Civil" the results of the tests. These were designed to determine the relative quality of steel with and without the addition of nickel. The two steels, as is shown in the accompanying table, differed only in the amount of nickel added to one of them, the quantity being about 3%.

The method of manufacture and the charges of both heats were absolutely identical. The ingots for both heats were rolled into boiler plate under ordinary conditions.

CHARGE.	Size in in., 8-in. specimen.	Section, sq. in.	Elongation, per cent.	Elastic limit, lbs. per sq. in.	Tensile strength, lbs. per sq. in.
Nickel steel:	1.602 × 0.300	0.4806	23¾	.....	64,080*
Scrap, 9,000 lbs.	1.645 × 0.245	0.403	26	47,100	63,370
Pig, 9,000 lbs.	1.605 × 0.302	0.4847	25	44,700	66,060
Ferro, 165 lbs.	1.582 × 0.245	0.3875	24½	47,400	67,100
Nickel, 540 lbs.	1.495 × 0.310	0.483	26	47,300	64,890†
	1.495 × 0.310	0.483	23¾	48,200	66,200
Ordinary steel:	1.545 × 0.245	0.3785	26	35,700	55,500*
Scrap, 9,000 lbs.	1.666 × 0.245	0.408	26	35,500	54,600
Pig, 9,000 lbs.	1.670 × 0.292	0.4876	27½	32,800	53,900
Ferro, 160 lbs.	1.610 × 0.290	0.4756	32	34,060	52,500
	1.570 × 0.303	0.454	27	35,500	53,700†
	1.480 × 0.305	0.451	26	37,900	56,500

* Not annealed. † Annealed.

The deductions made from these results are these:

1. Nickel steel has on an average a higher limit of elasticity of 11,400 lbs. per sq. in., or nearly 31%.
2. Nickel steel has an ultimate tensile strength greater by 10,400 lbs. per sq. in., or an increase of about 20%.
3. The ductility is not reduced by the presence of nickel.

The Latest American Steamer.—It is claimed that the steamer "El Rio," recently built at the yards of the Newport News Shipbuilding Company for the Morgan Line between New York and New Orleans, is the largest American built steel steamer in the merchant service. "El Rio" is 406 ft. long, 48 ft. beam and 4,500 tons gross measurement. On her trial trip recently she ran at a speed of 17 knots an hour.

A Long Mine Tunnel.—The Kansas State Inspector has recently examined and approved a tunnel driven under the bed of the Missouri River connecting the Home and Riverside coal mines at Leavenworth. These are the deepest mines in Kansas, and the tunnel is more than 5,000 ft. in length. The main openings of the two shafts are two miles apart, and the tunnel was driven to afford means of escape for each mine in case either should meet with an accident. The work on the tunnel was performed by double crews of men working night and day for more than a year from opposite ends. The tunnel was planned by E. A. Sperry, as engineer, and built under his charge.

USE OF PRODUCER GAS FOR DRYING AND ROASTING ORE AT THE LIXIVIATION MILL OF THE HOLDEN SMELTING AND MILLING COMPANY, ASPEN, COLO.*

By Willard S. Morse.

The ores of the district are treated at this mill by the lixiviation process, consisting of drying, crushing, chloridizing, roasting and lixiviation by hyposulphite and Russell solutions. Gas is used for fuel for both drying and roasting.

The gas plant consists of two Taylor revolving bottom gas producers, one 6 ft. in diameter for the ore dryers, the other 7 ft. in diameter, for the Stetefeldt furnace. The producers were made by Messrs. R. D. Wood & Co., Philadelphia, who also furnished the burners, pipes, valves, etc., for the plant, from designs by Mr. C. A. Stetefeldt.

The coal used in producers consists of a mixture of coals mined in this district, in the proportion of about one-third Sunshine nut coal and two-thirds New Castle nut and pea coal. The best results were obtained by this mixture, principally on account of the character of the ash obtained, rendering the working of the producers easy, and avoiding the necessity of reducing the capacity of the mill while cleaning the ashes from the producer. We found the Sunshine coal used by itself made much less tar in the gas-pipes, but on account of the character and quantity of clinker produced was very troublesome to get out of the producer, while the ash from the New Castle coal was so fine and packed so close, that it was not possible to work the producers up to their capacity on account of our inability to force air and steam through the bed of ashes. A mixture of the two, however, seemed to produce the desired result.

The following is an average of a number of analyses made during the year of these coals:

	Sunshine.	New Castle.
Water	2.8	1.7
Volatile matter	36.3	37.95
Fixed carbon	37.1	48.6
Ash	23.8	11.6

Only one partial analysis of the gas has been made, which was as follows: CO. 20%; CO_2, 2.8%.

All figures given in this paper are totals and averages for a run of over a year, or from November 10th, 1891, to January 1st, 1893.

The drying plant consists of four Stetefeldt double shelf dryers. Each dryer is fired by two gas burners. Three complete dryers and one-half of the fourth dryer are used for drying ore, and the other half of the fourth dryer is used for drying salt. The total amount of ore dried is as follows: Gross weight, 65,743,605 lbs.; moisture, 4,029,761 lbs., or 6.13%; net dry weight, 61,713,889 lbs.

The total amount of salt dried is 7,544,610 lbs.; gross weight, containing probably not to exceed 1% moisture.

All the moisture is driven out of the ore, which is delivered from the dryers at about 180° F. During the operation of drying, however, the temperature is much higher, as the heat on the top shelves of the dryer is greater than on the lower shelves where the ore is delivered.

The gross weight of coal consumed in producer for making gas for dryers was 2,646,580 lbs., costing on an average $3.0977 per ton, or an average for each ton of ore and salt dried of 72.22 lbs. of coal, costing $0.1118.

The chloridizing roasting of the ore is accomplished in a Stetefeldt furnace. The gas is supplied to the furnace with three burners, two to the shaft of the furnace, in which about 60% of the ore falls, and one burner to the return flue.

The average composition of the ore for the run was as follows: Ag, oz per ton, 27·91; Pb., 2·27; SiO_2, 21·64; $BaSO_4$, 20·92; CaO, 10·99; MgO. 4·24; Fe, 10·02; Zn, 2·85; S, 8·10.

The ore after roasting averages about 0.2% of sulphur as sulphide.

The total ore roasted, dry weight, was 61,713,889 lbs.; the total coal consumed was, 3,624,080 lbs.; costing on an average $3.0977 per ton, or an average for each ton of ore roasted, of 117.44 lbs. of coal, costing $0.1819.

I have received a number of inquiries from smelters as to the adaptability of the gas fire for roasting ores in a reverberatory furnace, and raising the question if enough heat could be obtained for that purpose. In this connection the result of an accident may be interesting. On account of one burner in the shaft of the furnace becoming closed with an accumulation of tar, all of the gas was forced through the other burner, making such an intense heat as to fuse or slag the ore that had accumulated on the bridge wall. The fused ore ran into the air flue, completely filling it, and necessitating the cooling off of the furnace to clean it out.

The analysis of the fused ore was as follows: SiO_2, 28·6; $BaSO_4$, 19·4; Fe, 5; CaO, 8:1; MaO, 3:6. If heat enough can be had to fuse this combination, certainly no trouble should be had to obtain sufficient heat to desulphurize the ores, and slag the ore in the fusing box of the reverberatory furnace.

I think that improvements could be made on the plant here by providing better facilities for cleaning the gas pipes of tar, and also by better insulation to prevent the condensation of tar in the pipes, and the suggestion of Mr. W. H. Blauvelt to the writer of lining the pipes with fire-clay tile would be excellent, as it would not only act as insulation, but it would then be an easy matter to clean the pipes of tar by burning them out, without danger to the iron pipes.

A Tall Wrought Iron Chimney.—A chimney of considerable height has recently been put up at the works of the Darwen & Mostyn Iron Co., at Darwen, England. The masonry foundation is 15 ft. high, and on this rests the wrought iron tower, 260 ft. in height. The lower section is a cone 28 ft. high, tapering 10½ ft. in diameter; above this is the main shaft, 232 ft. high with a total taper of 6 ft. The iron shell is lined with firebrick, and its total weight is 1,100 tons.

* Read at Montreal meeting American Institute Mining Engineers.

THE MESABA IRON RANGE.*

By Horace Winchell.

The Mesaba belt was first examined by mining experts in 1875, all of whom reported adversely. Captain Nichols, undeterred by these and subsequent unfavorable reports, spent two years prospecting, and on November 16th, 1890., was rewarded by the discovery of the Mountain Iron Mine. It should be stated that the State Geologist and his assistants prophesied in 1888 that ore would be discovered in quantities exceeding the deposits in the Penokee and Gogebic.

The ore formation of the Mesaba range extends in Minnesota, from the Canadian boundary, a little west of south, 140 miles to and beyond the Mississippi River, in township 55-25. The width varies from two miles to less than one, and the thickness from nothing to 100 ft. The ore deposits are not continuous over this area of 140 or so square miles, but are found at intervals, where the conditions necessary for their formation exist. The ore varies also, that at the eastern end of

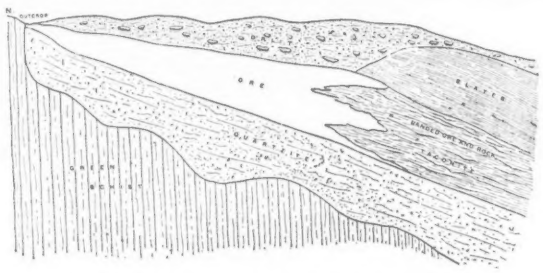


FIG. 1.—SECTION AT THE BIWABIK.

the ridge being hard, black and magnetic, and on the central and western parts mostly soft hematite, limonite and goethite. One characteristic of the ore bodies of the Mesaba is that their width corresponds to the depth of those of the Vermillion and Marquette ranges, so that as much ore lies within 100 ft. of the surface, as on the other ranges down to the depth of a mile.

Geology.—For a full description of the geology of this district reference is made to "The Iron Ores of Minnesota. Bulletin No. 6, Geol. Nat. Hist. Surv."

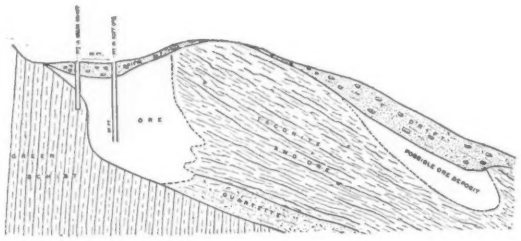


FIG. 2.—SECTION AT KANAWA AND HALE

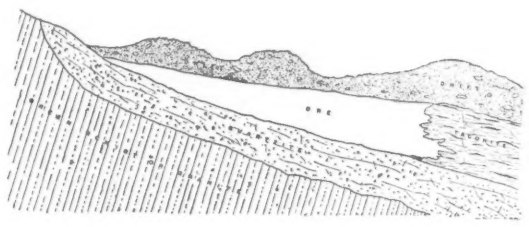


FIG. 3.—USUAL OCCURENCE OF ORE.

The rocks exposed in the Mesaba are as follows, in descending order: 7. Gabbro, unconformable on slates, taconic; 6, Black slates (animikie), taconic; 5, greenish silicious slates and cherts, taconic; 4, iron ore and taconite horizon, taconic; 3, quartzite, unconformable on 1 and 2, taconic; 2, green schists of the Keewatin, archean; 1, granite or syenite of the Giant's range, archean. By careful distinguishing between these various rock-horizons, much costly work and many fatal mistakes may be avoided, e. g., the green slates of the taconic and the green schists of the Keewatin must not be confused; the former lying generally above and the latter always below the ore.

Any confusion between chert and quartzite, too, must be carefully avoided. In determining such questions of structural relation, and deducing practical rules for guidance in the field, the geologist renders the miner the most direct service.

Granite of the Giant's Range is composed of rather coarse crystalline grains of gray or flesh-colored feldspar, blue translucent quartz and black mica, has no bedded structure, is older than the rocks of the iron formation proper. It is bounded on the north by a belt of crystalline mica and hornblende schist, and on the south seems to pass by direct transition into the

2. Green schists of the Keewatin, commonly called greenstone or diorite. They are gray to green in color, are softer than the granite, and have an earthy appearance. They never occur in horizontal layers, and when not massive have a ceavage almost vertical.

The basal quartzite always rests on 1 or 2, and the nature and extent of the ore deposits appear to be totally independent of the species of the underlying rock. The green schist does not always follow the course of the granite range, but diverges, forming minor ridges, which are essential accompaniments of bodies of soft ore. These schists are covered in many places by

3. Quartzite uncomformable to Nos. 1 and 2. This is composed of rounded grains of silicious sand and is white, gray, green, pink, or purple in color. Immediately under the ore, it has generally been changed to a crumbling sandstone. No merchantable iron ore is found below it, except occasionally in the green schist.

4. Iron Ore and Taconite Horizon.—Resting on the quartzite is a series of strata of very different appearance in different localities, and which under favorable conditions forms the ore deposits. These strata are of silicious and somewhat calcareous rocks banded with oxide of iron. The ore, either magnetite or hematite, occurs in irregular beds, and is inclosed by a generally gray kind of jaspery quartzite, which, differing from any other rock, and being peculiar to this Taconic horizon has been named by Mr. Winchell, taconite. This banded jaspery quartzite is not generally high enough in iron to render it marketable, but it is found in all degrees of alteration up to good iron ore.

5. Greenish Siliceous Slates and Cherts.—There is no proof of unconformity either above or below this, but lithologically it is distant from the others. The chert is red, yellow, black or white.

6. The animitric black slates are of carbonaceous argillites and are several hundred feet in thickness, and with a dip to the south or southeast, varying from horizontal to 20°. These slates are supposed to extend under the gabbro and reappear at the St. Louis River, with a high dip and distorted stratification. If this is so, it is possible that the lower horizon of iron ore and quartzite may rise to the surface and thus another iron range may be discovered still nearer Duluth, but it is obvious that with the high dip of the St. Louis slates the ore deposits would soon lead to deep mining.

7. Gabbro.—Must be distinguished from granite, with which it is sometimes confused. The granite is of a pink color and contains crystalline grains of lavender-blue quartz, while the gabbro is gray and contains no free quartz. From Birch Lake eastward the gabbro, flowing like lava, came so far north as to cover the iron ore deposits completely, and by its heat changed the ore into hard and magnetic varieties. There is good reason to believe that the iron ore deposits in their present condition have been formed principally since the gabbro overflow. There was a certain amount of iron in the rocks originally, but this has been greatly augmented and concentrated in more recent times. The ore under the gabbro will be found to be magnetic, perhaps titaniferous, and is sure to be mixed with lean siliceous strata.

Occurrence of the Ore.—The Mesaba ores do not occur in veins or lodes, but in regular beds. Nor do the bodies have true footwalls or hanging walls. It is true that the quartzite on which the ore lies may be conveniently termed a footwall, but it is not a footwall proper, nor is the occasional covering of jasper a proper hanging wall. The soft ore bodies follow the slopes, and when these change direction the deposit either ends or changes its course. There is no principle more universal on the range than this: "The presence or absence of an ore body depends on the presence or absence of an elevation on the slope of which the proper horizon of taconic strata occurs."

The theorie of surface wash of the ores and eruptive flows are discarded in favor or deposition form aqueous solution. The Mesaba ore deposits are part of the taconic strata lying next above the basal quartzite. The ore lies directly on the latter, which is softened and disintegrated. While the extent of an ore deposit depends upon the size and slope of the elevations, the nature of the lateral boundaries of the ore deposits is a matter of speculation at present.

The upper edge of an ore body is thin and contains the poorest ore, and the ore again detoriates at a certain depth, until it becomes too much mixed with sand from the quartzite, when it is too poor to mine. The upper and lower sides of the ore bodies show rather abrupt transitions into the jaspery quartzite of the iron ore and taconite horizon. The ore, however, extends into the rocks in sheets of variable thickness, as is shown by Fig. 1, a general section at the Biwabik after the ore had been stripped.

Varieties of Ores.—Magnetite, titaniferous magnetite, goethite, limonite manganiferous ores and hematite ores are all found, but the last named is by far the most important. The best variety is the blue-black soft ore, one sample of which analyzed: Iron, 67·90; silica, 1·8; phosphorus, ·016.

Origin of the Ore.—The observed phenomena are: 1. There is a deposit of ore situated on a hillside or in a basin. 2. This ore is regularly stratified. 3. The planes of stratification, dipping less than 30°, pass from the ore into and through the banded jaspery quartzite or taconite horizon in three directions and occasionally on all four sides. 4. The ore strata correspond in texture with the rock strata which appear to be their continuation. 5. Underlying the ore is a quartzite horizon. 6. Just beneath the ore this quartzite is decomposed into a crumbling sandstone, but it becomes vitreous a few feet lower down. 7. This quartzite is impervious, and presents an absolute barrier to surface infiltration. This fact is shown: (1) By microscopic examination of the vitreous quartzite; (2) by test pits sunk into it; (3) by the large amount of surface water in the ore, as the boundary between the ore and quartzite is approached. The ore is porous and permits the water to filter through it. Test pits are sunk through dry ore to the depth of nearly 100 ft., when the ore body covers a considerable area, but water in large quantity is invariably encountered a few feet above the quartzite. The theory of replacement is further strengthened by the existence of partially ferrified rocks with ore in bands, showing progressive deposition, and by knolls of unaltered taconite lying on top of the ore deposits. It has been proved that the ore occurs, neither above nor below, but precisely at the taconite horizon, and that the formation of ore has been limited by local conditions. Certain strata of taconite ap-

* Abstract of a paper read before American Institution of Mining Engineers, October, 1892.

pear to be more easily ferrified than others, and on the Cincinnati, some of the basal quartzite has been replaced by iron oxide.

In seeking an explanation of this process of replacement we meet many puzzling questions: What started this process? How could so much quartz be removed? What has become of it? From where did the iron come?

It is not believed that the iron ore originally occurred as a carbonate, the decomposition of which furnished the necessary solvent for the quartz, but it does seem probable that the solvent for silica was carbonic acid in aqueous solution, derived from either the atmosphere or the black slates, now eroded, which may have covered the ore deposit at one period. The atmosphere of earlier geological epochs, it may be said, is thought to have contained much more carbonic acid than the present, and the black slates contain a notable percentage of carbon. The silica thus leached out was probably redeposited in the rocks of lower horizons or those of a lower level. The iron is believed to have been largely the result of oceanic deposition, both chemical and mechanical, and to have been concentrated in its present situation.

Quality of the Ore.—The average of 145 samples from 12 mines gives: Iron, 61·05; silica, 6·18; phosphorus, ·0544. Manganese was found in 54 of these samples varying in amount from ·06 to 1 657%, and with an average of ·667. Of the 12 mines the Biwabik makes the best showing, giving as an average of 60 samples: Iron, 63·70; silica, 3·46; phosphorus, ·0455.

Method of Prospecting.—During the winter, pits are sunk in favorable situations to the depth of more than 100 ft. with pick and shovel, rarely aided by powder. In the spring, pumps are needed.

If the ore deposit lies in a rock-rammed basin there is usually considerable water in the ore. If it lies on a hillside and is of considerable extent, the water filters down through the ore to the basal quartzite, and the upper part of the ore body is quite dry, even in very wet seasons. It follows that the presence of water in an ore pit is simply an indication that it cannot get away, while its absence is a sign that it can escape, probably by filtering down in the ore, which is therefore concluded to be of considerable amount.

The Method and Cost of Mining.—When the surface is stripped off, the ore is found in flat deposits, covering 60 or more acres and from 20 to 90 ft. thick. Test pits are sunk in places 117 ft. deep by pick and shovel without a single drill hole or blast of powder. In other spots there may be 20 or 30 ft. in a pit which is too hard to pick. This can be thrown down in large quantities when there is once a face on it, and can then be loaded by hand or steam-shovel. Where no blasting is required the expense of loading cars by hand labor will not exceed 25 cents per ton; by steam shovel it may reach 10 cents. Where the ore is hard enough to blast, the expense of excavating and loading on cars may reach 40 cents. It is not necessary to reckon into our calculation any interest on a large investment, for that is covered by royalty. No expensive plant is depreciating. Fewer damage suits arise from injuries received, because men work by daylight. When the surface is removed, the ore is practically in a huge stock-pile containing, in some instances, several millions of tons. At the maximum cost of mining this by hand, and in hard ore, the cost of stripping and placing ore on cars is 48 cents per ton. The minimum cost is 11.2 cents. The average is about 29.5 cents. But as there is more soft ore than hard, the average may be expected to be about 25 cents.

The approximate cost per ton of the ore delivered in Cleveland will be from $2.55 to $3.45, distributed as follows: Mining, 0.25 to 0.50c.; royalty, 0.50 to 0.65c.; railroad freight to the lake, 0.65 to 0.80c.; lake freight to Cleveland, $1 to $1.25; insurance, commissions, etc., 0.15 to 0.25c.; total, $2.55 to $3.45.

The average price of 60% Bessemer ore at Cleveland is not far from $4.25. If the large amount of Mesabi ore made suddenly available should force the price down to $3.75 per ton, there would still be a profit for the average Mesabi mine operator.

German Patents.—The German Patent Office received last year 13,126 applications, and granted 5,900 patents, against 12,919 applications and 5,550 patents in 1891.

Consumption of Rails in France.—According to Bulletin No. 672, of the Comite des Forges, the quantities of rails received in the works for account of the principal French railway companies during the year 1892, were as follows: Nord, 22,628 tons; Ouest, 18,138; Est, 18,309; Paris-Lyons-Mediterranean, 32,300; Orleans, 42,000; Midi, 17,737; State, 12,728; total, 163,840 tons. The consumption for five years past has been: 1892, 163,840; 1891, 112,857; 1890, 66,844; 1889, 58,046; 1888, 93,868 tons.

Coal in Russia.—Although there are many rich coalfields in Siberia the output is quite insignificant owing to the very limited market for this class of fuel, says "Industries." There are coal and lignite deposits in the various parts of Caucasia, but they are poor owing to the smallness of the seams. Ikvihul, in the Government of Koutais, produces about 1,600 tons of coal annually, while the output of the Government of Kouban slightly exceeds that figure. There are many deposits of coal in the Kirghiz Steppes, and as many of them are in proximity to navigable rivers they might in course of time become important, like those on the Irtis and Buchtarma. There are also many deposits of good lignite in the Government of Samarkand in Russian Turkestan; as yet, however, the demand for this product is small. There can be no doubt that these deposits will be worked in the future, for, owing to the scarcity of timber, the only fuel available for carrying on any industries which may arise will be lignite. The coalfields belonging to the Imperial Cabinet in the Government of Tomsk, in Western Siberia, contain the germs of an extensive coal industry. At present the output does not exceed 12,000 tons per annum, which is taken up by the smelting, glass making, distilling and forging establishments in the district.

THE GOLD MINING INDUSTRY OF NOVA SCOTIA IN 1892.*

Pending the issue of the official figures the best estimate places the yield of gold for 1892 at 22,000 oz., as against 23,391 for 1891.

About four-fifths of this product is from the six districts of Oldham, Caribou (Moose River), Stormont, Malaga, Montagu and Uniacke—each having a yield in excess of 2,000 oz.

The district giving the largest production was Oldham, with a total of 3,100 oz. This is the largest yield in the history of this district, which has steadily increased its product each year from a total of only 824 oz. in 1884, to 3,100 in 1892.

Caribou and Moose River have a total yield approximating 3,000 oz., of which Caribou has about two-thirds and Moose River one-third.

The Dixon Mine, though not a heavy producer, is a very steady one, and is likely to continue its normal production throughout the year. The importance of the discoveries made in the latter part of the year on the property of the Truro company is shown by the very large yields milled in November and December, which have swelled the total for this district over 1,000 oz. There is every reason to suppose that development of this property will largely increase Caribou's product for 1893. Stormont shows a gain of nearly 2,000 oz. over 1891, which is due entirely to the successful working of a large body of medium grade rock by the Antigonish Mining Co.

In December the County Harbor Company cut the same lode in depth on its property, and as the latter company has now a 20 stamp-mill in running order the production of this district in 1893 should be very much increased. The returns for 1892 are in the neighborhood of 2,700 oz., of which the older portion of the district, Isaacs Harbor, contributes only 165 oz. This small amount is due to the continued idleness of the Palgrave Mining Company from long protracted litigation.

Malaga district shows a decrease, amounting to over 2,000 oz., having a total of about 2,600 oz., as against 4,664 in 1891.

The total collapse of the Parker-Douglas Mining Company in January, 1891, and the low grade rock encountered in the last half of the year by the two other companies working there will account for the decrease. The yield for 1893 is likely to show another decrease, as it is rumored that the Malaga company has closed down.

Montagu shows a total yield of about 2,200 oz., 1,133 of which were won prior to the taking over of the properties in August by an English company.

South Uniacke shows a large falling off compared with 1891, due in part to the complete cessation of work by the Witherow-Putnam Mining Company, and in part to the diminished output of the Thompson-Quirk Mining Company.

The prospects for the next year are rather for a decrease than an increase, as the Thompson-Quirk Company are getting into deeper and wetter workings and the pay chute is fast approaching the boundary line of the property. No new shaft in adjacent property can be sunk to pay rock and become a producing shaft to any extent within the year. The older portion of the district (Mount Uniacke) does not show any signs of vigorous life.

One of the large gains of the year is shown in the Waverley district, producing over 1,000 oz., and is due entirely to the work carried on there by the West Waverley Gold Company, Limited, whose mill has only been in operation the last eight months of the year. The extensive works of the Lake View Company have remained closed down during the past year.

Perhaps the most notable decrease has been that of the once famous Salmon River or Dufferin mine, whose yield for 1892 is less than 1,000 oz. The most notable part of the decrease is in the small tonnage crushed; with a new modern mill capable of handling over 12,000 tons per year, the amount actually milled is about 3,700 tons. Recent examinations have shown this lode to be as large as ever, so that the decreased tonnage must be due to some policy of the management.

Sherbrooke still lies idle, its product for the year being about 150 oz. This district has been unfortunate in having its territory cut up into small areas held by people who have neither the capital, skill nor willingness to work them, and who have asked ten prices for their property whenever a possible purchaser appeared.

From the Western districts there was very little production in 1892. Gold River, Whitham, Brookfield, Carleton and Kemptville are practically idle and non-producers. Large sums of money, in the aggregate, have gone into these districts, but have failed to produce paying mines.

Rawdon (both Central and East) continues idle, and Renfrew has suffered a total collapse. The mammoth mill at Gay's River has remained mute. Killag has had a complete new plant which was in operation in December, and this district is expected to be a prominent producer in 1893.

Ekelund Process of Coking Peat.—H. Ekelund, of Jonkoping, utilizes the heat from the cooling peat charcoal and the waste furnace heat to dry the peat preparatory to coking it, and in this way he is able to treat with advantage material too high in moisture to be otherwise employed. He gives a statement of the cost of production of such charcoal. Experiments with the Ekelund process of making coke from peat have been carried out at Omberg, near Motala, in Sweden. The furnace or oven is built of firebrick, and is divided into four chambers, 32 ft. high and 20 ft. square. The peat is conveyed on rails into the top chamber, where it is dried for two hours. It is then transferred through doors into the second, and then into the third chamber, in each of which it remains for two hours, and the coking is thus performed in two stages. After this the coke peat is transferred to the fourth or cooling chamber. The gas from the second chamber is passed through condensers to the third chamber, after which it is used for generating steam. The furnace will treat 10,032 cu. ft. of peat, with the production of 48 tons of coke in the twenty-four hours. The coke is either compressed or is used as produced.

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* From the Canadian *Mining Review*.

A METHOD OF TRANSFERING SURFACE ALIGNMENT UNDERGROUND

Written for the Engineering and Mining Journal, by L. Kuhn.

A method of transfering surface alignment to underground workings, through vertical shafts, is given here, as it is used a great deal in Montana, and gives good satisfaction.

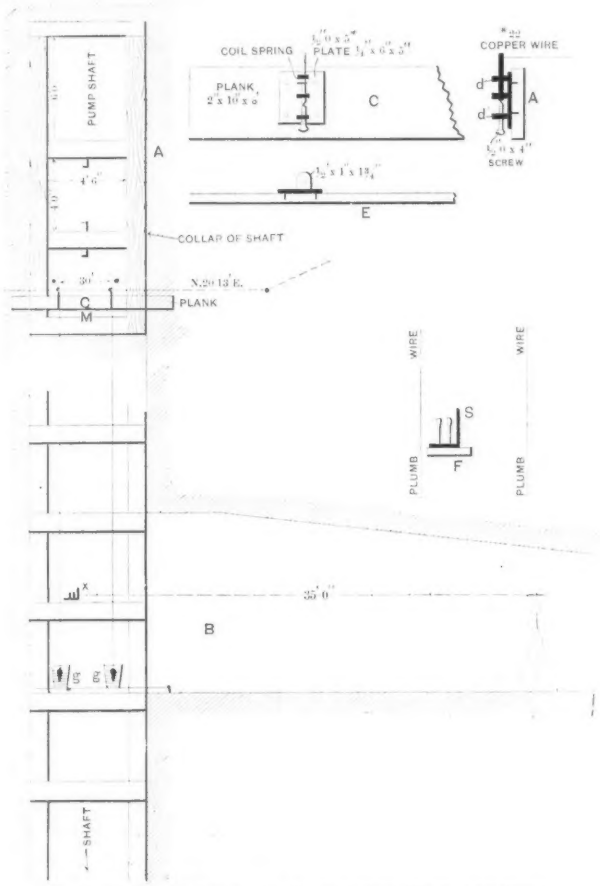
It is used at depths from 1,000 to 2,000 ft., and there is no reason why it should not be used for greater depths.

One compartment only of the shaft is occupied, while the cage may be run in the other, providing it is run at about half the usual speed, so as not to "fan" the wires, but it is better to have everything quiet if possible.

The method is simply to hang two plumb-lines in one compartment in line with a determined surface alignment—this line, generally, being the center line of the compartment—then range the instrument in line with the two plumb-lines, at the different levels where surveys are wanted.

By reference to the accompanying sketch the points of the method can be understood. A is a horizontal cross section of the shaft, at the collar, showing the plumbing board in place, across the shaft, and the two plumb-lines, 3 ft. apart, centered in the alignment N 20° 13′ E. The plumbing board C, D and E is a 2 in. × 10 in. plank, 8 ft. long, provided with two movable supports for the wires.

The support is a round iron rod ½ in. diameter and 5 in. long, resting in two iron upright pieces D, d. The rod has a groove across



TRANSFERRING SURFACE ALIGNMENT UNDERGROUND.

one end of it for the wire to rest in, and the other end is seated against a set screw and held against it by a small coil spring around the rod.

The plumbing board is placed approximately in line and nailed firm; then center each of the wires in line with the instrument, using the screws for setting the wires in line.

The plumb-line should be as fine as possible. However, a No. 22 copper wire is about as small as can conveniently be used; this size will stand a 10-lb. bob, which is sufficiently heavy.

When, the wires are centered in the supports, and they are ready to be let down, a small weight (1 lb.) is attached to the end of the wire and let down to the lowest level where alignment is wanted, and there made fast to one corner of the shaft, and pulled taut in the same corner as at the surface, so there will be no possibility of the other line coming in contact with it while being lowered down.

When both wires are down the bobs are put on and each placed in a pail of water; if the shaft is wet, use about 1 in. of common black oil on the surface of the water to prevent rippling by the water dropping down the shaft into the pails.

The same signals used in hoisting can be used here to advantage, between the person at the bobs and the one at surface; as, for instance, three light jerks of the wire to raise it, two to lower, and one to stop.

When the lines are still the instrument is ranged in line with the wires. From experiment the writer has found 35 to 40 ft. distant from the wires to be a good point to place the instrument.

It will facilitate the work to light one of the wires, the one farthest from the instrument, and have the wire nearest the instrument dark; in this way one will be able to distinguish the wires, having one light and one black. The light should be placed as close as possible to the wire to be lighted, but itself screened from view at the instrument, so that only the light reflected from the wire is visible at the instrument.

B is a vertical cross section of the shaft and station, showing bobs in the pails, the two plumb-lines, and the instrument; f in the shaft shows the position of the lights. F is an enlarged section of an arrangement which the writer has used to advantage. Six common candles are placed close to the wire, and hid from views by the screen S. The base on which the candles rest should be 2 in. longer than the screen, then by placing this end of the screen, about 1 in. to the side of the line of the wires, the base will be a light surface for the dark wire. An incandescent lamp is the best light, but common candles will answer.

When the instrument is in line, permanent line points are set within the caps of the station. When these are set and connected with the wires by measurement, the transfer of the alignment to this level is completed, and the other levels proceeded with in the same manner, the wires not being molested until all are finished.

A check can be made by recentering the wires 1 in. backward or forward, which will give a parallel line. However, if the wires are exactly the same distance apart at the bobs as at the surface, it would be almost impossible for either of them to touch at any point of the shaft.

One of the wires is the O station for the mine and all surveys of the mine, both surface and underground, begin or are connected with this station, O.

Let all angle points be stations; that is, make each station an angle point running consecutively from O.

If traverses are used in mapping, the O of the surveys is the O of the traverses.

With wires of the above size and used as outlined I have repeatedly checked surveys within 3 minutes, which is close enough for practical work.

A Swedish Warship.—The latast cruiser built in Sweden is the armored cruiser "Thule," recently launched at Finnboda. She is a twin-screw vessel with engines of 3,150 h. p., capable of a speed of 16 knots. The protection consists of a water-line armor belt, a protective deck and two turrets. She will carry two 10-in. and four 6-in. guns, with a number of small rapid-fire guns. The ship is 261 ft. long, 48 ft. beam and 3,100 tons displacement.

Crushing and Separation of Ores.—In a paper recently communicated to the American Institute of Mining Engineers in conclusion of the discussion on the "Crushing of Iron Ore for Magnetic Separation," President Birkinbine gives some interesting facts on the cost of crushing and separating at the Atlantic mine, near Hancock, Mich., as furnished by Mr. John Stanton. At this mine the results for the year 1891 were: Rock stamped, 297,030 tons; product of mineral, 5,089,700 lbs.; product of refined copper, 71·78% of the mineral, 3,653,671 lbs. The average yield of rock treated was 12·3 lbs. of copper per ton of rock treated, or 0·615%; the gross value of the product was $1·5467 per ton. The cost per ton of rock stamped, including all charges of every kind, was:

Mining, selecting and breaking, and all surface expenses	$0.9529
Transportation to mill	0.0386
Stamping and separating	0.2582
Total working expenses at mine	$1.2497
Freight, smelting and marketing products, including New York office expenses	0.1847
Total running expenses	$1.4344
Expenditures charged to construction	0.1107
Total expenditure per ton of rock	$1.5451

The yield of the ore in 1891 was below the average; the cost of stamping and separating was also lower. For six years, however, this cost has varied less than two cents per ton. The stamping is done by five Leavitt steam stamps with 18-in. steam cylinders, the aggregate product averaging 1,000 tons a day. The practice at the mine is to convey the rock as hoisted from the mine to a "rock-house," in which the barren rock is picked out, as far as practicable, before the copper-rock is crushed. The latter is carried on an elevated track connecting each shaft with the rock-house, the cars being hauled by an endless rope, operated by power in the rock-house. The cost of handling the rock on the surface, including transportation to rock-house, selecting poor rock, and crushing the copper-rock, is less than 7 cents per ton of rock milled. The rock is broken to a size in which the largest pieces are about that of broken coal. After crushing, the rock falls into pockets, from which the cars are loaded by the brakemen of the train that conveys it to the mill. If, therefore, there is added 7 cents per ton for crushing, the total cost of treating ore from the time it is dumped at the shaft-head until the concentrate is delivered at the smelting works, is less than 33 cents per ton of rock suitable for milling.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining metallurgy and kindred subjects issued by the United States Patent Office:

TUESDAY, FEBRUARY 21ST, 1893.

492,003. Manufacture of Chlorates of the Alkaline Metals and Metals of the Alkaline Earths. Henry Gall, Hermes, Oise and Amaury de Villardy de Montlaur, Paris, France.

492,007. Concentrating Machine. Franklin G. Gould, Boston, Mass., and Joseph K. Firth, San Francisco, Cal.

492,039. Pulp-Screen. Eugene Meurer, Palmer Falls, N. Y.

492,040. Process of Recovering Precious Metals. William P. Miller, Redding, Cal.

492,057. Riffle. Flavel Simonsin, Milwaukee, Wis.

492,133. Process of Recovering Gold. John Blair, Ardtrea, Canada, Assignor to L. C. Dillman, Frank Wilson and G. G. Eaton, Spokane, Wash.

492,221. Extracting Gold from Its Ores. Carl Moldenhauer, Frankfort-on-the-Main, Germany.

492,225. Apparatus for Condensing Fumes. Frederick Muelier, Butte City, Mont.

492,377. Electric Reduction of Refractory Metallic Compounds. Thomas L. Willson, Leaksville, N. C.

PERSONALS.

Mr. George Bowers has been appointed city engineer of Lowell, Mass.

Mr. Irving M. Scott, of the Union Iron Works, of San Francisco, is now in this city.

Mr. Henry Whitney, superintendent of the Mountain Queen mine, Idaho, is in Boston on business.

Mr. Samuel M. Gray, of Providence, R. I., has been engaged to plan a sewer system for the city of Meridian, Miss.

Mr. Lewis H. Davis has been appointed mechanical Engineer of the National Lead Company, with office in New York.

Mr. Albert Rokusek has been appointed manager of the Chicago & Wellston Coal Company, with office in Chicago.

Mr. J. R. Matlack, Jr., will act as representative of the Riehle Brothers Testing Machine Company at the Chicago Exposition.

Mr. O. Wolff, a prominent Danish engineer, is visiting this country, his special object being the study of sewerage systems and water works.

Mr. William L. Lyle, the mining man of San Francisco, has gone to San Bernardino County, Cal., to take charge of the Vanderbilt mines.

Mr. M. R. Hunt, of Ashland, Wis., has been appointed manager of the Gogebic Iron and Steel Company's new furnaces at Norwood, Mich.

Mr. Alfred P. Boller, the well known bridge engineer, delivered a lecture recently at the Rensselaer Polytechnic Institute on the new bridge over the Harlem at 155th street, New York.

Mr. William L. Saunders, engineer and secretary of the Ingersoll-Sargent Drill Company, will be re-elected mayor of the city of Plainfield, N. J., where he lives, without opposition, both parties having nominated him unanimously.

Mr. B. B. Lawrence, of the firm of Hooker & Lawrence, mining engineers, of New York and Denver, has been for three months past professionally employed in the East and South, but returned to Colorado February 20th.

Mr. Charles Storer Storrow, the eminent hydraulic engineer, who built the great dam on the Merrimac, at Lawrence, has been elected an honorary member of the American Society of Civil Engineers. Mr. Storrow is now 84 years old.

Germans are to build the railroads in Siam. Three engineers from the Prussian State railroads, Messrs. O. Kaeppler, E. Bock and August Werner, have been appointed assistants to Mr. K. Bethge, chief engineer for the Siamese government.

Mr. Jacob Rogers has retired from the presidency of the Rogers Locomotive Works in Paterson, N. J., which he has held ever since the company succeeded the old firm of Rogers, Ketchum & Grosvenor. His successor is Mr. Robert S. Hughes, who has been secretary and treasurer for many years.

The receivers appointed by the court for the Philadelphia & Reading Railroad Company and the Coal and Iron Company are Archibald A. McLeod, president of the company; Elisha P. Wilbur, president of the Lehigh Valley company, and Edward M. Paxson, late chief justice of the Pennsylvania Supreme Court. Judge Paxson resigned his seat on the bench to become one of the receivers.

The following appointments of executive officers of the Pensylvania R. R. have been announced: John P. Green, second vice-president, in place of J. N. DuBarry, deceased; Charles E. Pugh, third vice-president, in place of Mr. Green; S. M. Prevost, general manager, in place of Mr. Pugh; J. P. Hutchinson, late superintendent of the Maryland Division, general superintendent of transportation, in place of Mr. Prevost. A new office, engineer of maintenance of way, has been created, and is filled by Joseph T. Richards, late assistant chief engineer.

At the annual meeting of the Delaware, Lackawanna & Western company, in New York,, February 21st, the following officers were elected: Samuel Sloan, president; Frederick F. Chambers, secretary; Frederick H. Gibbens, treasurer; board of managers, John I. Blair, George Bliss, Percy R. Pyne, William W. Astor, William H. Appleton, William Rockefeller, Eugene Higgins, Henry A. C. Taylor, Andrew H. McClintock, J. Rogers Maxwell, George F. Baker, James Stillman, Robert F. Ballantine and Alexander T. Van Nest. The three last named gentlemen are the only new members of the board. They fill the vacancies caused by the removal by death during the past year of E. S .Auchincloss, Benjamin G. Clarke and Wilson G. Hunt.

"There landed in Sidney, New South Wales, recently one of the most distinguished scientists of the United States. This was Dr. Peters, Jr., the eminent copper expert, whose works on the treatment of copper unquestionably rank among the very best books dealing with the subject. Dr. Peters only remained in Sydney a few hours, as he has to visit, professionally, the copper deposits at Mount Lyell, in Tasmania. The governments of South Australia and New South Wales ought not to allow so distinguished an expert to leave the country without availing themselves of his experience to ascertain whether their copper resources are not capable of satisfactory development. We are so much behind the Americans in scientific treatment of copper that the information such an expert could impart would be invaluable. Readers of the 'Engineering and Mining Journal,' of New York, will be acquainted with the articles Dr. Peters has written for that journal, which is unrivalled for the scientific information it places before the world."—Australian Mining Standard.

OBITUARY.

J. W. Moore, the millionaire coke operator, of Greensburg, Pa., died there on the 19th inst., aged 55 years.

George E. Spencer, ex-United States senator from Alabama, died at Washington, D. C., on the 19th inst., aged 56 years. He engaged at one time in mining operations in Deadwood, S. Dak.

William H. Melville, of the Geological Survey of Texas and a brother of Lieutenant Melville, the Arctic explorer, dropped dead of heart disease in the street at Austin, Tex., on the 18th inst.

Mr. Francois van Rysselberghe died in Antwerp, Belgium, February 3d, aged 45 years. He was considered a high authority on electrical questions, and was one of the foremost electricians in his own country.

Mr. John J. McDonald, who died in Montreal, February 9th, was a prominent contractor in Canada. He built several sections of the Intercolonial and the Canadian Pacific lines, and was at one time largely interested in coal mining.

Dr. John J. Craven died at his home in Patchogue, N. Y., February 14th. He was at one time prominent in scientific and military circles, and also paid some attention to engineering. He superintended the building of the first telegraph line between New York and Philadelphia.

Mr. George W. Lichtenthaler, who had for so many years past been connected with the Smithsonian Institution, and had made a considerable reputation as a conchologist and marine botanist, died in San Francisco, February 20th. He had been for several years past employed in studying and collecting the shells of the Pacific Coast.

SOCIETIES.

At the regular meeting of the New York Railroad Club, on February 16th, there were discussions on the use of dead-blocks with M. C. B. type couplers; on fastenings for couplers, and on the use of spark averters. At the business meeting 21 new members were elected.

At the regular meeting of the Canadian Society of Civil Engineers in Montreal, February 23d, a paper on "Transmission and Distribution of Power by Means of Compressed Air" was read by Prof. I. T. Nicolson and briefly discussed.

The first annual convention of the American Bimetallic League assembled at Washington, D. C., on the 22d inst. About 50 delegates from the Western States were present. Gen. A. J. Warner, president of the league, stated the aim of the league to be the securing of legislation for the free and unlimited coinage of silver.

The National Brick Manufacturers' Association, at its recent convention in Louisville, Ky., elected officers as follows: Anthony Ittner, St. Louis, president; A. S. McDonald, Louisville, Ky., first vice-president; W. D. Gates, Chicago, second vice-president; B. W. Blair, Cincinnati, third vice-president; C. P. Merwin, Berlin, Conn., recording secretary; Theodore A. Randall, Indianapolis, corresponding secretary; John W. Sibley, Birmingham, Ala., treasurer.

At the meeting of the American Society of Civil Engineers, February 15th, Mr. Owen's paper on "Road Construction" was discussed. Written discussions from Messrs. Prince, Crowell, E. W. Howe, W. H. Grant and Colonel Latham Anderson were read, and a number of members joined in the verbal discussion. In the course of this several protests were made against the use of too heavy rollers, and more care in the choice of stone for dressing roads was recommended.

At a meeting of the mining men of the Gogebic and Menominee ranges, Mich., held at Ironwood Ferbruary 2d, the subject of an association of all persons interested in mining on Lake Superior was discussed and a resolution adopted, that an effort be made to organize an association. It was also embodied in the resolution that an invitation be extended to the mining men of all districts of the Lake Superior region, to assemble at Iron Mountain, on March 22d, 1893, at 8 o'clock p. m., to effect an organization. Communications should be addressed to Mr. Wm. Kelly, secretary.

At the regular meeting of the Western Society of Engineers in Chicago, February 1st, a committee was appointed to prepare and report a financial plan for the society. The death of I. C. Chesbrough, a member, was announced, and a committee appointed to prepare a memorial. The paper of the evening, on "Comparative Tests of Two Smoke Consuming Devices for Steam Boiler Furnaces," was read by Mr. J. C. McMunn. The discussion was participated in by Messrs. Gillespie, Harding, Barker and the president. Mr. L. E. Cooley, upon being called upon by the president, delivered his promised contribution to the question of "Deep Water to the Atlantic."

The first annual meeting of the American Society of Irrigation Engineers, which was held in Denver, Colo., December 28-30th, had an attendance of about 150 members. The society now has 125 members, 15 being added at the meeting. The officers chosen were: President, Prof. L. G. Carpenter, Fort Collins, Colo.; vice-president, Wm. Ham. Hall, San Francisco, Cal.; secretary and treasurer, John S. Titcomb, Denver, Colo.; directors, C. K. Bannister, C. S. Stevenson, Charles R. Rockwood and Arthur D. Foote. It is expected that the next meeting will be held in Chicago, where many of the members will take part in the engineering congress. At the meeting a number of papers were read, discussed and referred for publication. There were also very interesting offhand discussions, with blackboard illustrations, and participated in by nearly every one present, concerning sand-gates, flumes, and other matters of live interest.

At the regular meeting of the Engineers' Club of St. Louis on February 15th, an invitation to attend the convention of the National Electric Light Association was accepted. The paper of evening was read by Mr. O. W. Ferguson on "Methods and Results in Precise Leveling." Mr. Ferguson described the instrument used, the methods employed and the causes of error. He cited results from different surveys, exhibited profiles, forms of book notes employed and speed of working. He gave the cost of precise leveling at $18 to $21 per mile for field expenses. Cited a polygon of 4,000 miles in length, extending from Chicago to New York, Biloxi, New Orleans, back to Chicago, that closed with an error of 1 ft. Stated that bench marks had been established every 1½ miles along the Missouri River from St. Louis to Sioux City by the Missouri River Commission. The paper was discussed by Messrs. Moore, Curtis, A. L. Johnson, Flad, Ockerson, Jolly, Colby, Blaisdel and Wheeler.

The Civil Engineers' Club of Cleveland met February 14th. The tellers reported that Edward Charles Cooke, John Ross Bitner, Samuel Graves, Willet Warren Read, Charles Frederick Uebelacker and Charles W. Foote had been elected active members, and Alvin Irwin Findley and James Wood associate members. The committee on nomination of officers for the coming year reported. The chair appointed the committee on the annual banquet. Mr. Herman read a paper on a "Weldless Chain," in which he said that oval link welded chain, as used in ship cables for hoisting, is produced in almost the same manner as it has been for several centuries past. Few, and but slight improvements have ever been introduced in this industry. Devices intended to supplant this class of chains have never succeeded; for all sacrifice the flexibility at every joint possessed by the ordinary chain. The new chain invented by the writer consists of links each formed of four separate parts, two side-bars, and two end-pieces. The latter are provided with suitable threaded cavities to receive the screw ends of the former. The links so constructed possess the flexibility of the common chain to the fullest extent. Material and form of each part are selected with regard to the work they have to perform in practical use, while the proportions at each joint are determined by careful calculation. The different sizes of this chain will be introduced by indicative numbers conveying full information as to strength, safe load and pitch of each size. The chain will be produced ready for use by means of automatic machines invented by the writer. Under the most trying tests this chain has proved its strength and reliability.

The regular meeting of the Engineering Association of the South was held at the association headquarters, Nashville, Tenn., on Thursday evening, February 9th, President E. C. Lewis presiding. Mr. E. N. Pegelsen, of Pineville, Ky., was elected a member, and Mr. John Hill Eakin, of Nashville, was elected an associate. The paper of the evening was presented by Prof. Wm. T. Magruder, of Vanderbilt University. His subject was "Mechanics as a Fine Art." He showed that while the Greeks are our masters in many of the arts, yet in mechanics and physics their notions were far from correct, owing to a supposed variance between theory and practice. After clearly drawing the distinction between science and art, he showed by example how an art, to be a fine art, must minister not to the material necessities or conveniences of man, but to his love of beauty, and that the essence of all fine arts is the imagination and that they cannot be produced or practiced by habit and calculation. The engineer or architect who starts to design a machine or structure, having determined its outlines by a study of the requirments of the problem, having worked by calcu-

lation from the rules of the arts, the form, size and strength of its various parts, has but completed the demands made upon him by a utilitarian age and the exigencies of business competition. To construct a building, erect a bridge or build a machine of such a design, that, while it may be in accord with all the rules of the art, yet offends the eye and does not appeal to our sense of beauty, at least by comparison, is to take a step backwards in civilization, to insult the taste of and to lose an opportunity to expand one's own mind. His paper was a plea for the freer use of the imagination and of the beautiful in structures and machines.

INDUSTRIAL NOTES.

The Minneapolis Bridge and Iron Company has been organized with $150,000 capital to build bridges and structural work generally.

The Star and Cresent furnace of the Cherokee Iron Company at Rusk, Tex., is to be sold by order of court, to satisfy judgments for $115,000.

The Southern Steel and Aluminum Company has started up its new bauxite furnace at Rome, Ga. This furnace has a capacity of 30 tons a day.

The Verona Tool Works is the name of a new corporation organized in Pittsburg to succeed the firm of Metcalf, Paul & Co., operating the works at Verona, Pa.

A 15-ton pillar crane has recently been shipped by the Yale & Towne Manufacturing Company, of Stamford, Conn., to Matanzas, in Cuba, where it will be used for wharf service.

The Roane Iron Company, Chattanooga, Tenn., has sold $350,000 mortgage bonds, and will build two new blast furnaces; one of two old furnaces will also be rebuilt and enlarged.

The Lebanon Iron Company, Lebanon, Pa., has elected J. M. Schenk, president; A. Hess, secretary and treasurer; Thomas Evans, superintendent; H. T. Hecht, assistant superintendent.

The Indiana Steel Company, Indianapolis, Ind., announces that it is now successfully rolling 20-in. steel I-beams, the first, the company states, that have ever been rolled west of Pittsburg.

The Deoxidized Bronze and Metal Company has been organized in Bridgeport, Conn., with $75,000 capital stock, and will operate the plant of the Deoxidized Metal Company, recently sold under foreclosure.

The King Iron Bridge Company, Cleveland, O., has the contract for the new bridge of the New York Central over the Harlem River, New York. The draw-span is to be 400 ft. long, and to carry four tracks.

The Tyler Tube and Pipe Company, Washington, Pa., has elected the following officers: President, W. P. Tyler; vice-president, Walter Woodman; secretary, Charles S. Stone; treasurer, Hon. N. E. Whitaker.

The Gatling Ordnance Company has selected a site near Buffalo, N. Y., upon which will be erected a steel plant for the manufacture of heavy ordnance for coast defense and naval purposes, also car wheels, steel plate, etc.

The Penn Tack Company has been organized at Norristown, Pa., to manufacture nails and tacks. The officers are: Joseph S. Rambo, president; William N. Easton, secretary and treasurer; William J. Clark, superintendent.

The Briar Hill Coal and Iron Company held its annual meeting in Youngstown, O., recently, and the following officers were elected: George Tod, president; Henry Tod, vice-president; H. H. Stambaugh secretary and treasurer; and J. G. Butler, Jr., general manager.

The Detroit Dry Dock Company is to build a new steamer for the iron ore trade, which will be 337 ft. long, 42 ft. beam and 24 ft. hold. She will have triple-expansion engines, with 22, 35 and 56×42-in. cylinders, and will carry 3,600 tons of iron ore on 16 ft. draught.

The Southern Iron Company has removed the two charcoal furnaces formerly at West Nashville to Allen's Creek, in Wayne County, Tenn. They are nearly ready to go into blast. The company has also completed a new charcoal furnace in Dickson County, Tenn.

Riter & Conley, Pittsburg, have just finished a caisson to be used in putting down a bridge pier in the Missouri River, at Omaha. It is 40 ft. diameter and 120 ft. high, with an interior casing 20 ft. diameter and the same height. Both shells are of ½-in. steel plate, with butt joints.

The contract for the ironwork of the new terminal station for the New York & Brooklyn Bridge, in Brooklyn, has been awarded to the Phoenix Bridge Company; its bid of $221,899 was the lowest. The other bids were $229,300 by Post & McCord, and $244,944 by Milliken Brothers.

The Radford Pipe and Foundry Company, of Anniston, Ala., is filling an order for 12,000 tons of pipe to go to Providence, R. I. The company made a large shipment of pipe to Syracuse, N. Y., recently, and has enough orders on hand from that city to keep the plant running for several months.

At the first annual meeting of the Wheeling Steel and Iron Company, Wheeling, W. Va., the old board of directors was re-elected without opposition, as follows: C. R. Hubbard, J. D. DuBois Alonzo Loring, Joseph Bell, Geo. K. Wheat, H. H. Hornbrook, Wm. F. Steifel, J. G. Hoffman, Sr., and E. W. Oglebay.

The new car ferry steamer for the Straits of Mackinaw has been launched at Detroit. She is 302 ft. long, 50½ ft. beam and 24 ft. molded depth, and has a screw at each end. There are two compound engines, the forward one having cylinders 28 and 52×40-in., and the after engine cylinders 32 and 58×48-in. The boat is strongly built, and sheathed with steel plate to resist ice.

The property and assets of the J. A. Fay & Egan Company, the formation of which was referred to in this column last week, have been valued by the appraisers at $2,586,858. The new company is capitalized at $2,500,000, divided as follows: $500,000 mortgage bonds bearing 6% interest; $1,000,000 preferred stock, entitled to 7% dividend before any payment is made to the common stock; and $1,000,000 common stock.

At the Carnegie Steel Company's mills at Homestead Pa., 16 new furnaces were begun last week. It is expected that the furnaces will be in operation August 1st, and are for use solely in the manufacture of nickel-steel armor plate. The Harvey process is to be applied. The furnaces will be each 36 ft. square and 15 ft. deep. The estimated cost is $15,000 for each furnace, and the total cost of the improvements $1,000,000. The machinery is now on the ocean, on its way from Birmingham, England.

The Jeffrey Manufacturing Company, Columbus, O., has issued a neat and handsomely illustrated catalogue, in which will be found a great variety of information. Chain belting for elevators and the transmission of power holds the leading place, but the catalogue includes also many kinds of hoisting and conveying machinery, boilers and steam engines, pulleys, shafting and hangers; screens and wire cloth, gearing of all kinds, complete equipment for coal mines, including coal cutters and drills; and, in fact, a very wide range of machine work. The catalogue will be found very useful for reference.

Representative Stump, of Maryland, has introduced into Congress a bill repealing the duty of 4 cents per pound on block tin, which will come into effect on July 1st, 1893. Chairman Springer, of the Ways and Means Committee, and Mr. Shively, of Indiana, who reported the reduction of the duty on tin plate at the last session of Congress, both declare that the repeal of the duty on block tin is of prime importance, and that they will urge action on Mr. Stump's bill. The McKinley Bill provides that unless the product of American mines exceeds 5,000 tons in some year before July 1, 1895, the duty shall cease, but the duty remains in force without any mitigation for two years, unless action is taken on the bill introduced by Mr. Stump today.

In the case of the Edison company against the Westinghouse Electric and Manufacturing Company, under proceedings instituted by the latter company for the purpose of determining the rights to manufacture the stopper lamp, Judge Atcheson gave an opinion on February 23d to the effect that the question was one not to be determined on a motion for a preliminary injunction on ex-parte affidavits at the request of the defendants, but that the difference in the construction of the lamp is such that a decision should only follow a final hearing after taking of testimony in the usual manner and after trial. It was also decided that the question might properly be determined in this court under pending proceedings. There is yet pending the petition of the Westinghouse Electric and Manufacturing Company asking the court to restrain the Edison company from bringing suit against customers of the Westinghouse company.

The first official trial of the pneumatic tube for mail transit in America was successfully made in the Philadelphia post office February 17th. Postmaster-General Wanamaker, after declaring that the system meant rapid communication between cities all over the world, himself sent the first package, which reached the sub-station, a half-mile distant, in one minute and three seconds, or at the rate of 45 ft. per second, with a pressure of six pounds to the square inch. Various other tests were successfully made. The tube is an ordinary 6-in. iron water pipe, bored out smooth, so that its diameter is 6⅛ ins. The carriers into which the mail will be put are of sheet steel. When loaded they weigh about 15 lbs., and will carry half a peck of letters or other mail matter. The Electric Pneumatic Transit Company put in the tube at its own expense, and will turn the plant over to the government for a year and run it free during that time. The government will then have the option of taking the plant at its original cost.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting machinery or supplies of any kind will notify the Engineering and Mining Journal of what he needs, his "Want" will be published in this column and his address will be furnished to any one desiring to supply him.

Any one wishing to communicate with the parties whose wants are given in this column can obtain their address at this office.

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

All these services are rendered gratuitously in the interest of our subscribers and advertisers; the proprietors of the Engineering and Mining Journal are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

Goods Wanted at Home.

2,947. An outfit for a canning factory. North Carolina.

2,948. Prices on a complete outfit of machinery for the manufacture of drain tile, including dry sheds and kiln. Tennessee.

2,949. Machinery for a 20-ton cotton oil mill plant. Texas.

2,950. A full outfit of machinery for scouring, carding and spinning wool; also for weaving a low class of trouserings, cotton warp and woolen weft. North Carolina.

2,951. Prices and catalogues of rails, fastenings and rolling stock. Texas.

2,952. Chloride of calcium. Ohio.

2,953. Machinery for making coiled hoops, staves, spokes, handles and shuttle blocks. North Carolina.

2,954. A moss gin and press. Georgia.

2,955. A second-hand, light mountain transit, with level to telescope, vertical arc, etc.; also a leveling rod. South Dakota.

2,956. Prices on a lumber dry-kiln, with a daily capacity of 5,000 ft. Virginia.

2,957. An emery grinding machine for grinding and gumming circular saws. Virginia.

2,958. Prices on spool and bobbin machinery. North Carolina.

2,959. An 18-ft. ventilating fan and engine. West Virginia.

2,960. Machinery for the manufacture of horse shoes. Georgia.

2,961. 3,000 ft. 3-in. wrought iron pipe. West Virginia.

2,962. Seasoned white oak spokes. Virginia.

2,963. 10 tons second-hand 20-lb. and 10 tons 12-lb. iron or steel T-rails. West Virginia.

2,964. Outfits for circular saw mills; one mill to have a capacity of 50,000 to 60,000 per day, and the others to cut 20,000 each; all with modern appliances, such as gang edgers, trimmers, cut-off saws, etc. West Virginia.

2,965. An outfit for an electric light station, including a 150-HP. return tubular boiler, a 100-HP., high-speed engine, a 75-kilowatt alternating current dynamo, an arc dynamo for 25 lamps of 2,000 c. p. each, and 200 30-ft. poles 6 in. at tops, chestnut or cedar. Virginia.

2,966. A set of tools for making and repairing boilers, such as punches, plate splitting shears, boiler tools, riveting machines and other tools and fixtures necessary for a boiler shop. North Carolina.

GENERAL MINING NEWS.

ALABAMA.

Cherokee County.

(From our Special Correspondent.)

During the month of February, and especially the past week ending the 18th inst., the weather has been so unfavorable, owing to the heavy and continuous rains, that mining operations in both brown ore and bauxite banks have been very irregular, and during the past week entirely suspended. All work in these banks is in open cuts, and considerable damage from slides of surface soil and clay has occurred. But the bauxite banks have suffered the least, because more attention has been paid to drainage, and, in fact, the work shows more system and practical knowledge. This will enable the bauxite miners, now that the weather promises to become more settled, to continue shipments at once, while most of the brown ore miners will be compelled to expend large amounts in dead work, as well as delay in shipments. This country is to-day the only one in Alabama in which active operations in mining for bauxite are being carried on. The Dike's district is the only producer. As more knowledge of bauxite becomes general, and more experience in handling the ore is gained, the result is, that the available supply apparently becomes more limited. During the past year, although this mineral has attracted more attention than ever before, and much prospecting in this county has been done, yet no new discoveries outside of this district have been made. In your issue of January 14th, I credited this county with the discovery of a bank, which I find really belongs to Georgia. Being located only a very short distance from the State line, caused me to err. The business of shipping is still confined to the Republic Mining and Manufacturing Company, of Hermitage, Ga., and the Southern Bauxite Company, of Piedmont, Ala. Active mining oper-

ations are at present being carried on in only two banks, one by each company. These two deposits, known as the "Wahoo" and the "Washer," are distant about one mile from each other. The first named lies in a northeasterly direction from the last. South of these no discoveries have been made up to the present time, but to the north a short distance several openings exposing bauxite ore have been made, and a large amount mined and shipped from two banks by these same companies. Judging from present indications, I would estimate the superficial area of the Dyke's district carrying bauxite, including the space intervening between the known deposits, as not to exceed one and a half miles in length by half a mile in width, with a general course from northeast to southwest. The "Wahoo" deposit is decidedly a pocket, but the "Washer" shows more stratification, with a regularity of dip toward the south, under a hanging wall of iron clay, which also dips under a deposit of brown ore, as a test hole, about 100 ft. south of the open cut, exposed; no foot wall has yet been encountered, although the ledge has been worked about 50 ft. to the north, from the hanging wall. In thickness, the ore at the face of the cut varies from the extreme north side, where it shows 40 ft., to the south side, where, it shows 40 ft., and dips under the iron clay wall. The floor of the cut is in ore, and the body is solid across the face, apparently continuing down to great depth, although no tests to determine this have been made. This deposit is in a hill, and the open cut was driven in at the base, work being continued on that same level towards the summit in a northeasterly direction. The body of ore has increased in thickness with the same regularity as the elevation has increased. The surface outeroppings can be traced for 50 or 60 yards further up the hillside to the northeast. As the summit is several hundred feet to the northeast of the present face of the cut, and about 200 ft. higher; should this ledge of ore sustain its continuity in that direction, this deposit alone would produce an almost inexhaustible supply, but no tests have been made to determine its extent in that direction. The solid ore up to the present time, has been encountered within 5 ft. of the surface. While the "Wahoo" is a pocket deposit, yet its extent is considerable. It lies more in the trough between the higher hills than on a hill, as does the "Washer" bank, and has been stripped for a width of about 120 ft., measuring from northwest to southeast. The open cut exposes the northeast face of the ore, and is being driven towards the southwest. The face of ore now exposed is about 25 ft. thick, with the floor of the cut in ore. Several test holes have been sunk a few hundred feet to the east of the present workings, on a tract of land owned by other parties, and a good grade of bauxite exposed. Such work as would indicate other pocket deposits has been done, but not sufficient to define the extent or establish the fact as to the average grade being equal to the standard required. Unless the demand for this mineral increases, the quantity in sight in Dike's district will more than supply the market, though we are patiently awaiting the day when both manufacturers of alum and aluminum will establish plants in the South. When this is done bauxite mining will prove a profitable industry, but at present the high rates of freight, required grade of ore and competition to be met cosume the bulk of the profit. The plant erected at Rome, Ga. for the alleged purpose of manufacturing aluminum has not yet, so far as I can learn, increased the demand for bauxite.

ARIZONA.

Pima County.

A Tucson correspondent writes as follows to the New York "Sun": "The history of the Mowry mines, in the Harshaw district, dates back to the first mining done by Americans after the purchase of this territory from Mexico. In 1855, Major Ewell, commander of Fort Crittenden, worked them successfully, shipping the ore to the Colorado mine, near New Aravaca, where large plants were then in operation. In 1858, Lieutenant Mowry purchased the mines, and immediately commenced working them on a large scale. Smelters and refining works were erected, and the property was developed very extensively. Three hundred men were employed at the mines and smelters, and the enterprise supported a population of from 500 to 1,000 people. The men were paid off in silver bullion made into bars of $5 and upward, and though at that time everything was very expensive the property paid handsome dividends. The ores consist of lead carbonates and galena. Only the richest of the ores were at that time mined and smelted, the carbonate ores being of no value. In 1863 the properties were confiscated by the government, which claimed that Lieutenant Mowry was furnishing the Confederacy with lead. From that time until 1874, when Dr. Bennett worked these mines for a short time, they have remained idle. About two years ago, the present owners, Messrs. Silverberg and Steinfeld, determined to uncover the ore bodies said to exist. They went ahead systematically, with hoisting works and improved machinery to find the old works. They have just got into the lowest workings of the mine, at a depth of about 200 ft., where a large body of good ore has been discovered. Several hundred tons shipped from near the surface were treated free of any charge, the smelters even paying in addition a royalty. There are now developed three distinct ore shoots, and the owners are still developing the extent of these ore bodies with the intention of founding a company for the reduction of the ores on an extensive scale."

CALIFORNIA.

Humboldt County.

(From our Special Correspondent.)

Jones Creek Mines, Eureka.—This property, which is situated half a mile from Humboldt Bay, has been leased to Eastern parties, who will develop it. The iron ore is red hematite of the best quality, and is practically inexhaustible. Work will commence at once, and the advisability of erecting a smelter is under consideration.

Napa County.

During January, quicksilver from the mines was shipped at Calistoga as follows: Mirabel, 760 flasks; Great Western, 383; Sulphur Bank, 110; Baker, 4; total for the month, 1,257 flasks.

COLORADO.

El Paso County.

Eclipse.—The suit of Tietje vs. Mason is on trial at the District Court at Colorado Springs. This suit is brought by plaintiff to annul a bond and lease on the Eclipse mine, given the defendant for $5,000. Plaintiff alleges that defendant knew of the existence of rich ore in the mine at the time, and took advantage of plaintiff's ignorance of that fact.

Lake County.

Iron Silver Mining Company.—Peter Campbell and others have begun suit in the United States Circuit Court, at Denver, against this company. The action is for $10,000 damages and the possession of the Sierra Nevada lode in California Gulch, Leadville, valued at $50,000. In 1885, the same case was tried by Judge Hallett, who decided in favor of the plaintiffs. The United States Supreme Court reversed his decision, and the case was sent back for retrial.

Ouray County.

New Guston Company, Limited.—The Guston mine has now at work 130 miners, and from four to six carloads of ore running from 50 to 225 oz. silver to the ton, are shipped out every day, says the Denver "Republican." There are good ore bodies, some of them 9 ft. thick, exposed in all the levels. From 100 to 150 mine cars of mineral are hoisted to the surface every day, and the same every night.

Rio Grande County.

Golconda.—This property, at Summitville, has suspended active operations, owing to a strike of the miners, the force of about 20 men having lately refused to accept a reduction of 50 cents per day. If work is resumed it will be on a reduced scale of wages, and with a much smaller force of men. The Golconda was a heavy shipper last summer, and is said to have large quantities of ore ready to stope. The ore carries gold principally, but increases in silver and copper with depth. The closing of the Golconda ends active operations at Summitville for the present.

IDAHO.

According to a "Sun" correspondent, the placer miners of Idaho City are feeling contented because snow has been falling steadily in the mountains. The Boise Mining Company, which was formed last year for the purpose of sinking through the false bedrock to ascertain whether there is a placer on the granite bedrock, is making arrangements for new machinery, as all of the stock authorized to be placed on the market by the trustees has been sold. Sinking will not be resumed until the snow disappears, as to resume work now would necessitate the construction of buildings. The main tunnel is driving ahead in the Sub Rosa, and it is expected that the extraction of ore will soon commence. It will be reduced in the Sub Rosa mill. This mine has been idle for the past 10 or 12 years, but when it was worked paid handsomely. A good clean-up was made at the Boulder mill a short time ago. O. A. Duquette has bought a half interest in the Illinois mine, Gambrinus district. This is a gold mine that was worked down to water level and then abandoned because water came in so fast that it could not be kept out without pumps, which the owners were not able to put in. The last crushing made yielded, it is said, about $35 per ton in free gold. The work of sinking a 250-ft. shaft on the Star mine, near Hailey has commenced. When it is down a large amount of ground will be opened by it and a cage will be put in. Henry Whitney, superintendent of the Mountain Queen, at Pioneer, has purchased a 100-HP. engine for this mill. Pat Slattery, Fred Peterson and Herman Myers have a good prospect on Applejack, near Pioneer. They have sunk a shaft 50 ft., and are now running a drift from the bottom to tap the main ledge. In a distance of 18 ft. they have cut several gold-bearing veins, all of which prospect well. Oakes and Poncia are taking out fine ore from their Pioneer mine. The chute is 180 ft. from the mouth of the tunnel, and is 30 in. wide. Bruce & Bottcher, who own the extension of the mine, are running a tunnel to develop it. The tunnel is now in 250 ft., and the survey shows that they will have to run 30 more to reach the vein. Assessment work has been done on several mines around Centreville, and they all show up well.

Lemhi County.

Lemhi Canal.—The construction of this canal near Salmon City will, it is said, prove of great benefit to the placer mining interests of the vicinity. On the first stream that will be reached by it there are 5,000 acres of auriferous gravel, which is said to average 12 cts. per cu. yd. The next stream is Bohannon Creek, where considerable mining has been done. It contains a great deal of ground that will yield 30 cts. to the cu. yd. of coarse gold. The gravel beds are from 15 to 40 ft. deep, and the ground 10,000 acres in extene. The next stream is Wimpee Creek, with 5,000 acres of gravel from 10 to 40 ft. deep.

Owyhee County.

Lamar Mining Company, Limited.—The following is the return for the month of January: Crushed during the month of January, 3,038 tons; bullion produced in the mill, $77,200; estimated value of ore shipped to smelters, $9,750; miscellaneous revenue, $635; surplus raised on bullion estimates, $5,044; total revenue, $92,629; total expenses, $40,805; profit for the month of January, $51,824; or at $4.90 to £ sterling, £10,576.

Ruth.—The adit tunnel being run on this mine on War Eagle Mountain is now in 800 ft., and lacks only a few feet of being directly under the rich shoot of ore which was worked in the upper tunnel several years ago. The lower tunnel is 190 ft. below the old workings, and has run into the same character of ore. It is rich free gold.

Shoshone County.

Coeur d'Alenes.—In regard to the rumored closing down of the mines of this locality, Mr. B. B. Thayer, the superintendent of the Poorman mine, talked to the Spokane "Review" as follows: "The closing down of the mines has not been talked about, has not even been intimated. The whole story is a lie out of whole cloth. To talk about shutting down the mines this season of the year is absurd. The spring thaws will soon be upon us, and we will have plenty of water for all purposes. If we did not shut down when we had to spend money for steam, we certainly will not do so now when we can soon get all the water we want. It is true the Poorman has been shut down for some weeks, but that is because we cannot get as much water as mines situated lower down can, because we need more water than smaller mines, which have been running right along, and because our flumes have been frozen up. But we have been rushing development right along, sinking shafts, etc. The Tiger mine is the only mine that has been running half shift; the Gem, the Frisco, in fact all the others have been running full force. The Poorman will start up as soon as we get water. We have a full crew of men, ready to start work as soon as the word is given. The Mammoth mine is now shipping more ore than it ever shipped before."

KENTUCKY.

The Diamond Coal Company has opened a new mine at Altamont, Ky., and has also leased the mine of the Altamont Coal Company.

MICHIGAN.

St. Lawrence Mineral Lands Company.—The annual meeting of this company was held at Ishpeming, February 15th. William R. Candler, Chas. T. Miller, Charles H. Little, Detroit; Alfred Kidder, Albert E. Miller, Marquette; Thomas Walters and George R. Persons were elected directors. Officers of the board were elected as follows: Alfred Kidder, president; Wm. R. Candler, vice-president; John H. Bissell, attorney; Geo. R. Persons, secretary and treasurer. A dividend was authorized, and is payable to shareholders of record of March 1st last, and will be paid March 15th. The company is developing its talc veins, and has several mines now being operated on the royalty plan. It owns the fee of a large tract, and is now beginning to realize something upon its investments.

Iron—Gogebic Range.

Colby Iron Company.—At present a force of some 600 men is employed at the mine. Sinking is now going on in shafts Nos. 8, 9 and 10, which are now down 640, 480 and 400 ft., respectively. At No. 5 Palms, the union shaft on the line between the Colby and Palms properties, cross-cutting and development work is being prosecuted.

Tamarack Mining Company.—No. 3 shaft is now down 2,800 ft. It has 1,400 ft. to go to reach the lode, and No. 4 has something over 2,000 ft. Last week the "crossing" or "fault" in the vein making south was struck in the 26th level, just north of the double shafts 9 and 10. It was first discovered at the 21st level, No. 8 shaft, and in reaching a depth of 500 ft. on formation has traveled nearly the whole distance from the shaft, about 480 ft.

Iron—Marquette Range.

Champion Iron Company.—This company has decided to place an ore crusher at the No. 6 shaft.

Lake Superior Iron Company.—The most westerly shaft of the two being sunk at Section 21, on the property of this company, has reached a depth of 320 ft. The shaft further east is down 370 ft., and rapid headway is being made. The machinery for the new engine house is not yet all received, but is expected shortly.

Iron—Menominee Range.

Hemlock River Mining Company.—Development work is being vigorously prosecuted at this mine

with a force of 75 men, says "Diamond Drill." Sinking from the 320-ft. level toward the 4th is progressing finely, and all work preparatory to increasing the force and shipping the ore is being carried on. Active mining will be inaugurated at the opening of navigation, and the mine will be in condition to greatly increase the output over last year.

Hope Iron Company.—This mine in the Crystal Falls district has been closed down and abandoned. The machinery has been shipped to Commonwealth and the mine is now full of water. The reason given was that the lens had been mined out, and that the present outlook did not warrant exploratory work, says the Norway "Current."

Lincoln Iron Company.—Owing to the stoppage of work at the Great Western mine, Crystal Falls, the Lincoln, located just alongside, has been forced to suspend, as it cannot take care of the water with its present equipment. The property is said to be showing well in ore.

Negaunee.—The miners of the Schlesinger mines have been granted the eight-hour shaft system. The working force at the mines has been increased.

Pewabic Iron Company.—The exploratory shaft has reached the depth of 145 ft. and cross-cutting will soon begin.

Quinnesec.—This mine has been sold to the Penn Iron Mining Company.

MINNESOTA.

Iron—Mesaba Range.

Biwabik Iron Company.—The steam shovel is now working 36 ft. from the surface and very close to the ore bed. From 200 to 300 yards of stripping per day is being removed.

MISSOURI.

Jasper County.

(From our Special Correspondent.)

Joplin, Feb. 20.

Saturday evening closed the most active week ofthe year in the mines of the lead and zinc belt. The weather was good during the entire week, and the miners worked with a vim. The ore buyers were all in the market. For everything offered prices were advanced from 50 cts. to $1 per ton, so the market closed at an average of $22 per ton. Lead ore made a slight advance and closed at $21.75 per thousand. Following are the sales of ore from the different camps: Joplin mines, 1,814,750 lbs. zinc ore and 223,880 lead, value $24,831; Webb City mines, 824,470 lbs. zinc ore and 49,350 lead, value $2,938; Carterville mines, 1,777,450 lbs. zinc ore and 28,610 lbs. lead, value $19,715; Zincite mines, 313,570 lbs. zinc ore and 3,400 lbs. lead, value $3,523; Oronogo mines, 117,630 lbs. zinc ore and 133,710 lbs. lead, value $3,984; Carthage mines, 70,000 lbs. zinc ore, value $794; Galena (Kans.) mines, 647,470 lbs. zinc ore and 661,470 lbs. lead, value $20,857; district's total value, $76,642. Eighteen mining companies operating on the Rex Mining and Smelting Company's land last week made a total production and sale of ore of 522,600 lbs. of zinc ore and 44,980 lbs. lead. The Gregory Mining Company is not now in the list of producers, as the mines are shut down waiting the completion of the new ore-dressing mill, which is almost completed. The machinery is all in place, and will be belted up this week; and when started will make the fifth large mill on this land.

The Standard Lead and Zinc Company, at Zincite.—Mention has been made before of this typical zinc mine, which has been worked continuously for the past five years on one continuous run of zinc ore. Early last fall Mr. J. H. Dangerfield, the general manager, determined to take up a stope and test the continuance of the ore downward. At a depth of about 12 ft. he opened up the richest and most solidified body of ore yet found in the mine. This led to the sinking of a number of winzes from the bottom of the 135-ft. level. Most of these proved up the same deposit of ore. Mr. Dangerfield has now spent about five months in a systematic plan of developing this new body of ore, and last week made the first run from the new work, and turned in 122,440 lbs. of zinc ore, at $22.50 per ton. The production from now on will be steady, and up to the full capacity of the ore-dressing mill. I mention this as a typical zinc mine, as from the first opening of the mine not a particle of lead ore has ever been found associated with the zinc blende.

MONTANA.

The commissioner of the general land office at Butte has just handed down an opinion which is of great importance, says the Anaconda "Standard." The question at issue was the necessity of filing proof of having done annual assessment work during the year in which application for a patent of the claim was made. The land commissioner at Helena, some time ago, decided in the negative, but his decision is now reversed by the general land commissioner, who says: In the judgment of this office it is the duty of registers and receivers to see that the provisions of paragraphs 74 and 75 of the circular of December 10th, 1891, are complied with, and any neglect to do so brought to the attention of this office by proper protest will receive due consideration. The paragraphs referred to provide, that, as a condition for the making of application for a patent according to Section 2325 (R. S. U. S.), there must be a preliminary showing of work or expenditure upon each location, either by showing the full amount sufficient to the maintenance of possession under the section above mentioned for the pending year; or if there has been a failure, it should be shown that work has been resumed so as to prevent relocation by adverse parties after abandonment. The "pending year" means the calendar year in which application is made, and has no reference to a showing of work at the date of the final entry.

Cascade County.

Paragon Mining Company.—A 2-ft. body of ore has been struck on the new tunnel on this company's property. This tunnel starts just above the shaft house on the Paragon, and runs to the Puzzler ground; the workings on which it is intended to tap. It is thought that the tunnel will tap the lead on the Puzzler at a depth of 800 ft., says the Anaconda "Standard," and as the ore in the shaft above runs 35 oz. silver and 28% lead on an average, it is expected to find a lead that will abundantly pay to work. From this tunnel it is expected to work all the claims of the property to advantage.

Tiger Mining Company.—The company has lately been adding to its force, and has now commenced sinking below the upraise. Shipments are made at the rate of one car per week.

Jefferson County.

Elkhorn Mining Company, Limited.—The following is the return for the month of January: Mill worked 25 days and crushed 883 tons. Bullion produced in the mill, $28,500; 380 tons of smelting ore sold, $20,000; total produce, $48,500; total expenses, $25,175; estimated profit for the month, $23,325; or at $4.90 to £ sterling, £4,760. The half-yearly shut-down for clean-up and repairs, in the early part of the month, occupied six days, thus accounting for reduction of monthly profit; the mill is now in full operation again.

Lewis and Clarke County.

Jay Hawk & Lone Pine Consolidated Mining Company.—Under date of January 20th the mine manager reports: "We have sunk the main shaft 30 ft. below the 1,100-ft. level, and for the last 10 ft. we have been sinking in what appears to be the upper part of a large ore body. As yet we have not the hanging wall, nor do we know the size and extent of the ore. The 1,100-ft. east level has been extended 60 ft. from the shaft; the ore is very good, and about 3 ft. thick. The 800-ft. level is being driven west to connect with the stopes above the 900-ft. level. The stopes in the back of the 1,100 west continue to yield the usual quantity of ore, as do the stopes above the 900-ft. level. We have commenced work in the Bonanza mine, and, so far, our developments are showing small quantities of very good ore. Mill—Everything is now in full working order, and usual quantity of bullion being produced."

Montana Mining Company, Limited.—The total output for January was $34,369 (the price of silver being taken at 83½ cents per ounce), and the working expenses for the month $39,800. In addition to 6,072 tons of ore crushed the mills during January, 3,400 tons of tailings from the dams were treated, yielding $9,300, at a cost of $4,600, which figures are included in the above return. In explanation of this return, Mr. Robinson cables that owing to the severity of the weather, he has been unable to make the usual monthly clean-up.

NEVADA.

The suit instituted by A. Pollard against F. Oest to recover $50,000 alleged to be due as a portion of the bullion proceeds of ore taken from the Oest mine, Devil's Gate district, was settled at Virginia recently. Oest agreed to pay plaintiff $600 and defray the costs of litigation. The plaintiff was an original owner of the property, and alleged that at the time of the sale Oest concealed from him the knowledge of the existence of an ore body, which subsequently produced above $100,000 in bullion. Mrs. Gruber, who also had an interest in the mine and sold out at the same time as Pollard, has a suit pending to recover damages on the same ground.

Esmeralda County.

Holmes Mining Company.—At the annual meeting of this company the following officers were re-elected: W. J. Sutherland, president; Ramon E. Wilson, vice-president; Charles E. Elliott, secretary, and E. P. Murphy, J. W. Burling and Edward S. Spring directors. Fred H. Corkhill was appointed agent of the company at Candelaria.

Eureka County.

(From our Special Correspondent.)

During the month of January there was shipped over the Eureka & Palisade Railroad in transit to Salt Lake City 1,293 tons of ore from the Eureka district, and 23 tons from White Pine district, making a total of 1,316 tons of ore.

Storey County—Comstock Lode.

Pumping operations in the Gold Hill mines were suspended several weeks ago, and the pumps have been removed. No water from the lower levels is now flowing into the Sutro Tunnel, but it is steadily rising toward that adit since pumping ceased in the Gold Hill group.

Belcher Mining Company.—The latest official weekly letter says: On the 350-ft. level the south drift from the west crosscut is in 52 ft. The face shows a mixture of porphyry, clay and quartz, the latter giving low assays. West crosscut No. 2, 100 ft. north of the winze, on the same level, is out 30 ft.—the face is in vein material; and the east crosscut, 55 ft. north of the winze, on the same level, is out 15 ft.—the face is in clay, quartz and porphyry. On the 300-ft. level the east crosscut from the south stope is out 30 ft. The face shows clay, quartz and porphyry. From the stopes immediately above and below the 300-ft. level we are extracting daily about 20 tons of good ore, which is being shipped to the Brunswick mill for reduction.

Crown Point Mining Company.—The latest weekly official letter says: The west crosscut from the southwest drift, 150 ft. south of the shaft on the 400 level, is out 293 ft. The face is in a mixture of clay, porphyry and low-grade quartz. We have been engaged in timbering and repairing this crosscut, are following the streak of pay north and south from the raise that was put up from the sixth floor on the 160-ft. level, and are stoping out about four car loads of ore per day.

Justice Mining Company.—The latest weekly official letter says: The south drift from the north stope is out 108 ft. The face is in fair-grade ore. Shipped to the Washoe mill during the past week 161 tons and 680 lbs. of ore, the average battery sample of which was $17.62 per ton.

Savage Mining Company.—The latest weekly official letter says: We hoisted 561 cars of ore from the 950, 1,100, 1,400 and 1,450 levels. Shipped to Nevada mill 450 tons and milled 450 tons. Average car sample assay, $19.91 Average battery assay, $20 64. Bullion yield for the week, $6,502.50. Shipped to the United States Mint at Carson, February 13th, 239 lbs. of crude bullion. On the 950 level the north prospecting drift from the eighth floor of the old stopes is advanced 60 ft.; face shows some fair-grade ore. On the 1,100 level they are still stoping ore from the upper floors. On the 1,300 level we continue stoping north and south in the ore passed through by the west crosscut 120 ft. south of the shaft. We have also started upraising in this ore, and are opening the second floor. On the 1,400 level the north stope was connected with the west crosscut 1,300 level. On the 1,450 level are stoping ore upward from the end of the west crosscut started 100 ft. from the south boundary.

(From our Special Correspondent.)

The following is the weekly tabulated statement of ore extracted from Comstock mines and milled, with the car sample and battery assays, bullion shipments, etc.:

Mines.	Tons Hoisted.	Car Sample Assay.	Tons Milled.	Average Battery Assay.	Bullion Product for Week.	Bullion Shipped.
Belcher	140	.....	.....	.....	.....	.....
Con. Cal. & Va.	490	26·38	415	22·70	.....	.....
Justice	.....	.....	161	17·62	.....	.....
Potosi	406	29·04	350	25·36	.....	[1]485 lbs.
Savage	[2]561	.....	450	20·64	6,502.50	239 lbs.

[1] Crude bullion. [2] Cars.

Hale & Norcross Silver Mining Company.—The Supreme Court has rendered a decision as to the sufficiency of the bond filed in the suit of Fox against the directors of the above company and others. It will be remembered that when judgment was rendered in the Superior Court by Judge Hebbard, the defendants gave notice of appeal and filed a bond with the Western Surety and Guaranty Company as security. A full description of this bogus corporation has already appeared in the columns of the Engineering and Mining Journal. To-day the Supreme Court of the State has declared the bond offered insufficient, and in doing this has substantiated all that has been said regarding the clique of defendants who banded together and formed a corporation for the purpose of giving a "straw" bond. This "guarantee company" having failed in its purpose, will now presumably dissolve. It was shown to the satisfaction of the court that the paid up capital of the Western Safety and Guaranty Company was only $100,000, and "to say that such a bond is sufficient to insure the payment of a judgment of $1,000,000 is absurd. The law contemplates that the bond must be fully capable of liquidating judgment for which a bond is given." The court further ruled that the financial condition of the stockholders in the Surety company could not be considered. Thus Alvinza Hayward, et al., receive another set-back and a more substantial bond must now be filed, and the question again answered: "What new device can be used to whip the devil round the stump?" or, in other words, "How may the spirit of the law be violated while obeying the letter?"

A meeting of managers and superintendents of Comstock mines was held in San Francisco, Cal., on the 17th inst., to discuss the situation on the Comstock lode. There were present John W. Mackay, James L. Flood, D. B. Lyman, A. C. Hamilton, H. M. Gorham and others. A plan to reduce expenses and to begin pumping the water out of the lower levels, with the view of resuming deep mining, now that the upper levels have been well worked out, was considered. After a general discussion of the necessities of the hour it was deemed prudent, be-

f ore calling upon the stockholders of the mines for the money required to pump out the lower levels, to get some accurate data regarding the feasibility of the scheme, and D. B. Lyman, W. E. Sharon, R. P. Keating and A. C. Hamilton were employed as a committee to employ expert engineers to furnish data and estimates of the cost of pumping under certain conditions. Mr. W. R. Eckhart has already been engaged for the work. Mr. Lyman is quoted as saying that he thought the committee would be able to make a report upon the subject in about three weeks. According to the San Francisco "report," Mr. John W. Mackay said: "We don't feel like going into this pumping business until we thoroughly understand what the cost is to be. If we find it feasible and that it will not bankrupt the companies we will try it; otherwise we will drop it and let matters take their natural course. What we want is some statistics upon the subject, and it will take three or four weeks to get them. For my part, my only interest is in keeping miners employed, for times on the Comstock are hard indeed."

It is understood that after the committee appointed to-day has obtained its statistics as to the cost of pumping, the Miners' Unions at Virginia City and Gold Hill will be asked to submit to a reduction in wages, which are now $4 per day, and that the railroad, water, wood and other interests will be requested to make corresponding reductions, so as to offset the cost of pumping. Some people apprehend that labor troubles on the Comstock will result before this question is settled.

West Consolidated Virginia & California Mining Company.—A press dispatch from San Francisco states that suit has been begun there by Oscar C. Steele against the West Consolidated Virginia & California Mining Company and its officers, M. W. Fox and J. W. Brown. The plaintiff charges that the officers have known for more than 10 years of the existence of a big bonanza in this mine, but have refused to develop it until they have frozen out all the small stockholders. In other words, the chief defendant, M. W. Fox, is now charged with doing what he recently complained was done to him by the Hale & Norcross ring. Steele was the original owner of the West Consolidated Virginia mine, which was located under the name of the William Penn. It was patented in 1860, but no attention was paid to it till six years ago, when a good strike wos made in Consolidated Virginia, which carried that stock from $2 to $50 a share, and yielded over $6,000,000 in dividends. Then Steele had explorations made through the west wall of Consolidated Virginia into his mine, and the ore extracted by the diamond drill was very rich. Steele had no funds to develop the mine, so he made an arrangement with Fox and J. W. Brown by which they were to secure joint ownership by disposing of a part of the stock. This they did, but Steele says the money realized was eaten up by unnecessary expenses instead of being applied to development, and that he was frozen out. Samuel T. Curtis, an old mining expert, testifies in regard to the ore body in the mine. He said that his explorations in the virgin ground, to the west of the old Comstock lode, convinced him that a bonanza was lying there fully equal in richness to that which made millionaires of Mackay, Flood and Fair. Curtis also gave testimony in regard to Fox's failure to list the stock. The suit went on Thursday.

PENNSYLVANIA.

Coal.

A serious riot occurred on the 20th inst., at the Catsburg Coal Company's mine in Monongahela City between strikers and non-union miners. The mine has been in partial operation with colored men for several weeks, and the strikers have become discouraged.

The situation in the fourth pool is growing serious. The men have been on strike for nearly six months, and are becoming desperate, as the operators, it is said, have decided to start their mines with non-union men.

A dispatch from Pine Grove states that all the Philadelphia & Reading Coal and Iron Company's and individual collieries in the lower anthracite coal field, with the exception of the Lykens Valley collieries at Pine Grove, remained closed down on the 22d inst., to give the men an opportunity to observe Washington's Birthday.

Lytle Coal Company.—The first shipment of coal from this company's workings at Primrose was made on the 16th inst. The development of this tract was commenced in 1890. It was originally owned by the Philadelphia & Reading Coal & Iron Company, and J. C. Stickney & Co., of New York. Two slopes were sunk on the Primrose vein. The first was driven from the crop, following the irregular pitch of the vein to the level below. The second slope was driven through the rock at a regular pitch to the level. The company at the same time broke ground for the opening of two small tracts, contiguous to the Primrose, lying south and east. The favorable outlook for coal traffic in that part of Schuylkill county induced the Pennsylvania Railroad Company to build a branch road connecting the Lytle colliery with the main line of the P. S. V. road at Pottsville. The new branch was commenced shortly after the work of developing the coal tract started, and was completed last year. The road is seven miles long. The company completed a large breaker at the colliery last month, which was tested two weeks ago and found to work satisfactorily. About 200 men are employed at the colliery.

Nescopec Coal Company.—The following have been elected directors of this company for the current year: E. B. Leisenring, Robert H. Sayre, George D. McCreary, John Thomas and H. B. Price. President, John Thomas; secretary and treasurer, S. B. Price.

Upper Lehigh Coal Company.—The following have been elected directors of this company for the current year: E. B. Leisenring, John Leisenring, Robert H. Sayre, Samuel Thomas, George C. McCreary, John Thomas, S. B. Price. President, E. B. Leisenring; vice-president, John Leisenring; secretary-treasurer, H. B. Price.

Oil.

There have been no large new wells struck in the oil districts since February 1st, but the activity in the two new districts along the Ohio southwest of Wheeling continues and the production there appears to have been slightly increased, but the increase in the new districts has not been sufficient to offset the decline in the older fields. The new wells have continued to show a comparatively small yield and so far test wells in advance of the hitherto known limits have failed to show any improvement in the nature of the territory. In some cases they have indicated that further considerable extensions of the paying area are hardly probable. The territory developed continues in good demand and from present appearances the outlying lands will be thoroughly tested during the next month or two. The receipts from the wells so far this month have averaged 75,600 barrels, a decrease from February, 1892, of 19,000 barrels daily. The shipments for like periods show a considerable increase. Since January 1st the production has averaged 76,500 barrels daily, against 95,000 in January and 99,000 barrels in February last year. The final reports for the month will, it is said, show an important decrease in stocks. The receipts of Western Ohio oil have so far this month averaged 30,000 barrels daily, which shows a further decrease in production. The shipments have been 42,000 barrels daily and the decrease in stock about 200,000 barrels.

SOUTH DAKOTA.

Representative Amerman has introduced in to the State Legislature a bill regulating the location and size of mining claims and the amount of assessment work to be done annually. Sections 1 and 2 provide that the size shall be the same as that provided by the revised United States statutes. Section 5 provides that before filing a location the discoverer shall locate his claim by first sinking a discovery shaft at least 10 ft. deep, 5 ft. wide and 7 ft. long thereon, and which must show a well-defined mineral vein, lode or deposit. Section 10 provides that if the top or apex of the lode in its longitudinal course extend beyond the exterior lines of the claim at any point on the surface, or as extended vertically downward, such lode shall not be followed in its longitudinal course beyond the point where it is intersected by the exterior lines. The work to be done annually is the same as that prescribed in the revised United States statutes.

Two Bears.—Operations on the lower levels of this mine have been suspended owing to the breakdown of the pumps, and there is now 40 ft. of water on the 3d level. A force of men are now at work repairing the break. Work continues in the upper workings.

Oro Fino Mining Company.—Ten stamps are now at work and in a short time the other ten will start. The tailings will be carried from the amalgamating plates to concentrators, where about 7 tons will be concentrated into one ton and the concentrates shipped to the Deadwood & Delaware smelter. The total depth of the shaft on the Two Bears, or Oro Fino, is 335 ft., with a 10 ft. sump. Sinking has been discontinued, but stoping and drifting are being pushed. The extent of the ore body on the lower level is not known, but it is believed to be extensive.

Lawrence County.

Annie.—Reports from this mine and others on Annie Creek are to the effect that an important body of ore has been struck, says the Deadwood "Pioneer." One tunnel of 360 ft. passed for 60 ft. through ore.

Highland.—It is expected that the grading for the hoisting works will be completed this week, when work will be begun on a two-compartment 9-ft. shaft, to be sunk to a depth of 1,000 ft.

Horseshoe.—The shaft has reached a depth of 312 ft., and is now in shale, under which it is expected that the ore will be found. The vein sought is a continuation of the Welcome vein, which is 50 ft. wide by 7 ft. deep, dips at an incline of about 8 ft. to the 100 directly toward the Horshoe. The Welcome company has worked it about 250 ft., and have about 750 ft. to run before reaching the line of the Horseshoe.

Horseshoe Mining Company.—The body of ore recently discovered in the 302 ft. shaft on this property has been cut through. The discovery shows itself to be 5 ft. in thickness. Immediately below the ore instead of slates, a body of shale was discovered, a certain indication of the presence of another body of ore. The company will continue sinking until it strikes the second contact, then drifting will be commenced.

TENNESSEE.

Coal.

The Galloway Coal Company has bought a large tract of coal land in Walker County, Tenn., and is sinking two shafts on the property.

The Soddy Coal and Iron Company is putting in a Robinson coal washer at its mines at Soddy, Tenn., and is arranging to make coke on an extensive scale.

UTAH.

Indian Reservations.—Utah papers report the leasing, by an Eastern syndicate, of all the mineral lands of the Uintah and Uncompahgre reservations, which cover nearly 10,680 square miles. The lease was signed at the Ouray agency on Feb. 17. The consideration is a royalty of $1 per ton of ore of every description taken out, to be paid to the Indians. The lease is for 10 years. The lands are said to contain valuable deposits of asphaltum, besides silver ores. The lease will have to be approved by the Interior Department. A New York man named Thornton is said to be at the head of the syndicate.

Beaver County.

Good reports continue to come in about the new gold fields on Indian Creek, says the Salt Lake "Mining Journal."

Iron County.

Iron County Coal and Iron Company.—At the annual meeting in Salt Lake, February 16th, this company elected officers as follows: Benjamin Hampton, president; W. S. Godbe, vice-president; William G. Sharp, secretary and treasurer; George Swan, assistant secretary; W. S. Godbe, Benjamin Hampton, John Sharp, Lyman Bridges and W. G. Sharp, directors.

Pioto District.—It is stated that a body of rich ore 5 ft. in width has been struck in the Belmont mine. The ore is copper, ruby and native silver in character. The formation is contact between trachyte and lime.

FOREIGN MINING NEWS.

BRITISH COLUMBIA.

Slocan.

Vancouver.—A 5-ft. vein of galena has been opened up at this mine, from which ore is being shipped to the Tacoma smelter via New Denver and Nakusp.

BRITISH GUIANA.

During January the gold mines of British Guiana reported a production of 4,660 oz. of gold, on which royalty was paid to the Mining Department. The largest producer was the Conawarook, which reported 1,795 oz.

ONTARIO.

(From our Special Correspondent.)

Sudbury District.—For some mysterious reason nearly all the mining companies here positively refuse to give the representatives of the press any information about the mines, and to visit some of them on such a mission requires more bravery than Don Quixote's encounter with the windmill. But, nevertheless, we generally manage to find out what is being done in most of them one way or another. The item in my last notes about the Canadian Copper Company was written on very good authority, but in your issue of the 11th inst. the secretary of the company contradicts the statement as to why their mines were closed down in rather emphatic terms. What was the reason, then? But he has not enlightened us on this point. If he had done so his denial would have been far more satisfactory and conclusive. The prevailing opinion here, whether right or wrong, is that ever since the trouble between the company and Mr. S. J. Ritchie began, the aim of the company has been to depress the nickel interests of the district, and that the stoppage of the mines last fall was in pursuance of this policy. It is only fair to state, however, that the Canadian Copper Company is in all other respects highly thought of here.

This has been a very dull winter in this district, but there are several indications of renewed activity, if not an actual boom in mining here during the coming season. A representative of the French government is on his way to Canada now for the purpose of buying up a large tract of nickel lands in this district, as France proposes to adopt nickel-steel armor plates for her warships. A number of English and American capitalists are also negotiating for nickel properties here this spring.

The Ophir gold mine, back of Thessalow, on the north shore of the Georgian Bay, is being developed this winter. This property is undoubtedly valuable and promises to become a rich mine. Quite a number of important gold discoveries were made in the Lake Wahnapitae region last summer, but no work has been done on any of them yet. Nickel is king here now, but there is evidently considerable gold in the district as well.

The annual meeting of the Ontario Mining Association was held at Sudbury this week. Great dissatisfaction was expressed, at the meeting, with the new mining policy of the Ontario government imposing a royalty on ores.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, Deadwood, S. Dak.; St. Louis, Helena, Mont.; London and Paris, see pages 190 and 192.]

NEW YORK, Friday Evening, Feb. 24.

There has been no improvement in the mining stock market during the week. The dullness con-

tinues unabated. The holiday on Wednesday disturbed the even tenor of the Exchange's way and little business was done.

There is a better feeling in the Comstocks; that is to say, prices are somewhat higher. In our mining news columns will be found various items of interest concerning the Comstock mining companies. The feature of the week in the mining stock market was the demand for Comstock Tunnel stock, of which 17,500 shares changed hands at 10@13c.; sales of the bonds amounted to 9,000 shares at 14@17c. Consolidated California & Virginia advanced from $2.55 to $3, with total sales of 800 shares. Of Julia 1,600 shares were sold at 10@13c. Other sales were as follows: 200 shares of Crown Point at 55c.; 400 shares of Ophir at $2.10@$2.40; 200 shares of Sierra Nevada at $1 35@$1.40; 200 shares of Best & Belcher at $1.75@$1.85; 500 shares of Exchequer at 20@25c.; 300 shares of Mexican at $1.80@$1.90; 500 shares of Bullion at 70@95c.

Of the California stocks Belmont shows sales of 900 shares at 20@22c. Brunswick Consoldated was quiet this week, only 600 shares being sold at 9c. The Brunswick Consolidated Gold Mining Company on the 23d inst. levied an assessment (No. 5) of 2c. per share, payable immediatoly at the office of Mr. H. R. Lounsbery, treasurer, 57 Broadway, this city. The stock will become delinquent in San Francisco on March 28th, and will be sold on April 15th. The superintendent of this company, writing from Grass Valley on the 15th inst., says: We have finished the station at the 700-ft. level and have drifted 10 ft. east and 15 ft. west. We will not be able to take down the ledge in the east drift at present, as it protects the pump from rocks while blasting. In the west drift we have had a ledge from 6 to 18 ins. of good looking quartz, but it shows no gold. The ground in both drifts seems to be broken, and I think we shall have to go deeper to get into settled ground. I have stopped the drifts on the 600 level for the present.

The Standard Consolidated Mining Company has declared a dividend of 10c. per share, payable on March 24th. Transfer books close on March 14th.

Of the Colorado stocks we note sales of 500 shares of Chrysolite at 22c., and of 1,100 shares of Leadville Consolidated at 19@20c. Of Robinson Consolidated, there was a solitary transaction at 30c.

There was a sale of 100 shares of Caledonia at $1.15. No other Black Hills stock was dealt in during the week.

Ontario was stationary at $15, with total sales during the week 135 shares.

Sales of El Cristo this week amounted to 200 shares at 50c., and of Monte Cristo 3,800 shares at $3.10@$3.30.

Phœnix of Arizona this week shows sales of 3,700 shares at 15@20c.

Santiago, which had not been traded in for nearly two years, last Saturday showed a sale of 100 shares at 2c.

Boston. Feb. 23.

(From our Special Correspondent.)

The market for copper mining shares the past week has ruled extremely dull and inactive, with a lower tendency to prices throughout the list. There is very little disposition shown to speculate in this class of stocks, the general market offering larger inducements for profits, and, in consequence, mining stocks are neglected. The Montana stocks afford the bulk of transactions, and have declined under pressure to sell by parties who have been recent buyers. Boston & Montana declined from 34¼ to 32¾, and Butte & Boston from $11 to $10¼ on moderate sales.

Calumet & Hecla held quite strong at $310 until to-day, when a small lot could not find a purchaser at anything over $307.

Tamarack was also quite strong at $162, losing only $1 in the latest transactions.

Quincy weakened to $136, a decline of $1 for the week.

Osceola also showed weakness, not from any want of confidence in the property, but from a lack of orders to buy, which may be said of all the list. Osceola lost about $1 per share from the highest sale, selling at $36½. Kearsarge was off ¾, with sale at $11 against $11¾ last week.

Franklin holds steady at $13 to $12⅞, small lots bringing the former price.

The dealings in Centennial have been very small this week, and the stock has declined under the bearish influence of the market to $8 per share.

A small lot of Atlantic sold at $10¼, which is a gain of the fraction over last week.

Allouez sold at 75c. and Wolverine at $2½. Tamarack, Jr. was firm at $20, which is an advance of $1 for the week.

3. P. M.—The market this afternoon was heavy. Calumet & Hecla declined to $305, Boston & Montana to $32½, Butte & Boston to $10¼, Franklin to $12¾, and Osceola to $35½. Tamarack advanced $1 to $162 for five shares only.

San Francisco. Feb. 17.

(From our Special Correspondent.)

The mining stock market has, for the most part, been dull and heavy during the week, but to-day an improvement took place, the greater number of stocks being active, and in the Pacific Board, at advanced prices. The Supreme Court decision in the Hale & Norcross case caused the stock to be in demand in the afternoon at a point in advance of the morning's ruling. The city press ventures to say that a suitable bond will be given before the expiration of the "20 days allowed by law." This is an error. No time is allowed by law, although it is certain that the defendants will apply to the court for time to fill a new bond. It is just as certain that the application will be opposed and for cause. The contention of the plaintiff that the bond previously offered was worthless, not presented in good faith and fraudulent on its face has been sustained by the supreme tribunal of the state, and time can only be afforded by the court to perfect a bond when some defect or omission has been made by defendants acting honestly and in good faith. The defendants in the Hall & Norcross case have failed in their effort to prostitute justice, and have no rights before the law in any attempt to perfect what the court by its ruling has denounced as fraudulent. They can only rely on the mercy of the court and the plaintiff for even so short a time as twenty-four hours within which to prepare a new and honest bond.

At the opening session of the Board this morning Consolidated and Virginia sold for $2.40, advancing 5 cents during the day and closing steady. Ophir sold up to $2.10, and Mexican sold for $1.75; Sierra Nevada for $1.25 and Union Consolidated for $1.05.

In the middle group of Comstocks, Best & Belcher sold for $1.60; Chollar, for 55 cents; Gould & Curry, for 85 cents; Hale & Norcross, of which over 2,000 shares were sold in the afternoon sessions, for $1.35; Potosi, for $1.40, and Savage for $1.

Of the Gold Hill and South End Comstocks, Belcher has been quiet, in light demand at 75c. Bullion sold to-day for 65c.; Consolidated New York for 35c.; Crown Point for 60c.; Justice for 25c.; Overman for 40c., and Yellow Jacket for 65c.

Nothing has been done during the week with any of the outside stocks, the sales having only established a price. Of the Bodies, Bulwer Consolidated has been quoted at 10c., Bodie Consolidated at 5c., and Mono at 5c.

In the Quipotoa group Crocker, Peerless and Weldon are had for 5c. and Pees for 10c., Silver King for 25c.

The Tuscaroras, of which so much might be expected, are a drug on the market. Bell Isle and Navajo are held for 15c.: Commonwealth, North Belle Isle, Nevada Queen, North Commonwealth and Grand Prize for 5c.; and Del Monte for 10c.

The market continued steady at practically the above rates until the close.

SAN FRANCISCO, February 24th (*By telegraph*).—The opening quotations to-day are as follows: Best & Belcher, $1.75; Bodie, 5c.; Belle Isle, 10c.; Bulwer, 15c.; Chollar, 55c.; Consolidated California & Virginia, $2.90; Gould & Curry, $1; Hale & Norcross, $1.30; Mexican, $1.90; Mono, 10c.; North Belle Isle, 5c.; Navajo, 15c.; Ophir, $2.25; Savage, 95c. Sierra Nevada, $1.35; Union Consolidated, $1.15; Yellow Jacket, 60c.

MEETINGS.

Big Bend Hydraulic Company of South Dakota at the office of the company, 181 Broadway, New York City, March 7th, at 11 a. m.

Delhi Mining Company, at the office of the company, No. 14 Sansome street, San Francisco, Cal., March 8th, at 10 A. M.

Denver Natural Gas and Oil Company, at the office of the company, rooms 19 and 20, Mining Exchange Building, Denver, Colo., March 14th, at 2 p. m.

Hale & Norcross Silver Mining Company, at the office of the company, Room 26, Nevada Block, No. 307 Montgomery street, San Francisco, Cal., March 8th, at 1 P. M.

Indian Creek Land and Mining Company, at the office of the company, Mills Building, San Francisco, Cal., March 17, at 2 P. M.

Ironclad Gold and Silver Mining Company, at the office of the company, No. 407 Boston Building, Denver, Colo., February 28th, at 3:30 p. m.

ASSESSMENTS.

COMPANY.	No.	When levied.	D'l'nqt in office.	Day of sale.	Amt. per share.
Andes, Nev	39	Jan. 21	Feb 24	Mar. 16	.25
Belcher, Nev	45	Feb. 8	Mar. 14	April 4	.50
Belle Isle, Nev	17	Jan. 9	Feb. 14	Mar. 8	.10
Best & Belcher, Nev.	53	Jan. 16	Feb. 21	Mar. 14	.25
Caledonia, Nev.	45	Jan. 28	Mar. 2	Mar. 23	.10
Challenge Con., Nev	14	Feb. 11	Mar. 16	Apr. 6	.20
Con. St. Gothard, Cal.	7	Feb. 9	Mar. 17	May 6	.05
Dalton, Utah	..	Jan 31	Mar. 8	Mar. 18	.01
Exchequer, Nev	35	Jan. 26	Mar. 1	Mar. 22	.10
El Leopoldo, Mex.	2	Jan. 26	Mar. 3	Mar 28	.05
Gray Eagle, Cal.	70	Dec. 15	Feb. 6	Mar. 2	.07
Hale & Norcross, Nev.	103	Jan. 7	Feb. 10	Mar. 3	.50
Independence, Nev.	18	Jan. 27	Mar. 6	Mar. 29	.05
Jack Rabbit, Cal.	2	Dec. 29	Feb. 16	Mar. 7	.05
Justice, Nev.	53	Jan. 6	Feb. 9	Mar. 2	.10
Morgan, Cal.	16	Jan. 28	Mar. 6	Mar. 30	.10
Navajo, Nev	24	Jan. 9	Feb. 13	Mar. 7	.10
Nevada Queen, Nev	53	Jan. 16	Feb. 21	Mar. 14	.25
North Belle Isle, Nev.	22	Jan. 26	Mar. 3	Apr. 3	.10
North Commonwealth, Nev.	4	Jan. 24	Mar. 2	Mar. 7	.10
Overman, Nev.	66	Jan. 10	Feb. 14	Mar. 30	.25
Seg. Belcher & Mides, Nev.	11	Jan. 8	Feb. 7	Feb. 27	.25
Silver Hill, Nev.	32	Feb. 14	Mar. 21	Apr. 11	.05
South Eureka, Cal.	2	Jan. 4	Feb. 10	Mar. 6	.02
West Con. Va. & C., Nev.	1	Jan. 19	Feb. 23	Mar. 15	.25

METAL MARKET.

NEW YORK, Friday Evening, Feb. 24, 1893.

Prices of Silver per Ounce Troy.

Feb.	Sterling Exchange.	London Pence.	N. Y. Cents.	Value of $1.	Feb.	Sterling Exchange.	London Pence.	N. Y. Cents.	Value of $1.
18	4 88	38⅛	84	.639	22	.....	38⅜	.....	.....
20	4·88	38⅛	83⅞	.638	23	4·87¾	38 5/16	83⅝	.63
21	4·87½	38⅜	83¾	.637	24	4·88	38 5/16	83⅝	.63

Market has been quiet, without any special feature. Silver to arrive in 30 to 60 days is about ¼ to ¾ per cent. under current rates. Supplies, however, have somewhat diminished, with prospect of still further curtailment.

The United States Assay Office at New York reports the total receipts of silver for the week to be 245,000 ounces.

Gold and Silver Exports and Imports at New York for Week Ending February 18th, 1893, and for Years from January 1st, 1893, 1892.

	Gold.		Silver.		Excess of
	Exports.	Imports.	Exports.	Imports.	Exports.
Week	$2,750,295	$8,861	$387,815	$68,292	$3,060,957
1893	20,759,567	132,757	4,236,202	480,729	24,363,433
1892	2,563,922	2,018,755	3,810,539	248,415	4,107,291

During the five days ending February 24th the exports and imports of the precious metals have been as follows: Exports, gold, $3,088,054; silver, $357,537. Imports, gold, $411,374; silver, $34,468. Of the gold exported, $2,500,000 in American coin went to Bremen and $485,654 in Spanish coin went to Havana, the balance being American coin sent to the West Indies and South America. Of the silver exported but $166,000 was American, for England; the rest, with the exception of $6,100 in Chilian coin, being Mexican coin, also for England. Of the imports of gold, the largest for any week this year, $384,170, were francs from Havre. It is announced that $500,000 will go out on Saturday.

NOTES OF THE WEEK.

The most interesting feature of the week was the reception in Congress of the bill proposed by Senator Sherman enabling the Secretary of the Treasury to issue 3% five-year bonds for resumption purposes. After some opposition on the part of Senators Stewart, Teller, Peffer and Mills, the bill passed the Senate, February 18th, as an amendment to the Sundry Civil Appropriation Bill.

When the bill reached the House, Mr. Bland moved "that the bill should receive immediate consideration by the Committee on Appropriations and be reported back to the House at once, so as to enable us to have full and free discussion on certain amendments." This is regarded as a threat that the silver men will oppose Senator Sherman's amendment in the House. At the beginning of the week it was rumored that Mr. Carlisle has called a conference of the Democratic members of the House, at which it was resolved to present a compromise silver measure.

Mr. Cox, of the Banking and Currency Committee and an advocate of free coinage, prepared a bill which repealed the Sherman law and re-enacts the Bland law of 1878, with the proviso that the legal-tender character of the notes issued under the Sherman law shall not be impaired. The Secretary of the Treasury is directed to have coined the bullion purchased under the Sherman law into standard silver dollars and cover them into the revenues of the Treasury, but the silver dollars provided for under the Bland act, which is re-enacted, are to have priority in coinage so far as practicable. The Treasury notes issued in payment for bullion are to continue redeemable as now provided for by law and when redeemed are to be destroyed. The tax of 10% on the circulation of State banks is repealed.

Strong opposition to this bill was developed and it is now stated that the present Congress will not take action in the matter.

It will be noticed that all the bills introduced into the House repealing the Sherman bill have made provision for the continuous expansion of the currency by repealing the 10% tax on the circulation of State banks, a measure which since its enactment has been, and was intended to be, prohibited.

Whether this clause has been inserted with malice prepense, it is hard to say, but there is but little doubt that objection to it has had considerable to do with defeating the repeal of the Silver purchase Act.

The committee of the United States Senate which began a year ago a broad general investigation into the administration of national banks and the causes of national bank failures has submitted a voluminous report. Referring to the losses which have occurred to creditors of national banks since the first failure on April 14th, 1865, to the failure of the Lima, O., bank, March 21st, 1892, the committee finds that the annual average loss has been but one-twelfth of 1%, and they therefore conclude that the system as a whole produces as few losses and failures as can be expected under any system of banking which can be devised. The report criticises some of the Government supervis

ing officers very severely and makes a number of recommendations for reform in the system.

Senator Stewart has submitted the report of the Senate Committee on Mines and Mining, relative to the cost of production of gold and silver; The conclusions drawn are to the effect that it costs about the same to produce 25·8 grains of standard gold as it does 412·5 grains of standard silver, in other words the rates of coinage value adopted by the United States is just right.

The statements of the committee will not bear examination. The report was drawn up by men identified with silver interests and naturally reflects their particular desires and idiosyncrasies. We shall refer to it again at an early date.

Domestic and Foreign Coin.

The following are the latest market quotations for the leading foreign coins:

	Bid.	Asked.
Mexican dollars	$.65¾	$.66½
Peruvian soles and Chilian pesos	.60	.61
Victoria sovereigns	4.87	4.89
Twenty francs	3.86	3.89
Twenty marks	4 74	4.78
Spanish 25 pesetas	4.80	4.85

Copper.—The market here is very dull, evidently in sympathy with London. Producers are growing a little impatient, and it certainly is surprising that consumers should have been able to remain out of the market so long. The larger lake companies are holding at 12c., but the smaller ones and some second hand holders might sell a little at a trifle less. The prices of casting brands have been lowered to11@11¼, according to quality. Refined Arizona pig ocpper is held for 10¾@11, and ordinary Arizona pig at 9·85. There are some rumors current that the Anaconda will produce more heavily. As our readers know the smelting works have not been shut down, but only some of the principal mines, which are now to be started evidently because the stock of ore is much depleted. Anyhow, if the production there should largely increase it must have a dampening effect on the market, especially in its present sensitive state.

Abroad, things are now more assuring, there being a better demand which has reacted on prices, causing them to advance to £45 10s for spot and £46 for three months G. M. B.'s. Refined and manufactured we quote as follows: English tough, £48 10s.@ £49; best selected, £49 10s.@ £50; strong sheets, £57@ £58; India sheets, £53@ £53 10s., yellow metal sheets, 4½d.

The exports of copper from the port of New York during the past week were as follows:

To Liverpool—	Copper Matte.	Lbs.	
S. S. Germanic	3,319 bags	331,455	$15,000
" Tauric	378 pigs	40,058	1,809
" "	2,700 bags	300,915	13,000
" Gallia	4,177 bags	451,850	20,060
	4 opper.		
To Havre—			
S. S. Flamboro	762 pigs	228,458	$24,060
" La Bourgogne	158 pigs	56,136	6,000
To Stettin—	Copper.		
S. S. Bohemia	33 boxes	45,314*	$ 5,437
To Hamburg—	Copper.		
S. S. Dania	18 boxes	23,430*	$2,812
" "	12 bars	767†	1,900
" "	23 casks	28,810‡	2,225

*Electro. †Bullion. ‡Old; in transit.

Tin.—A large business has been done at gradually advancing prices. On the 14th, 100 tons for each March, April and June were sold at 20⅝ and spot at the same time, at 20·20, but since then the market has grown stronger, large quantities changing hands, and the closing prices are 20⅝ for spot, 20¾ for March, 20⅝ for April, 20⅝ for May and June. Prices abroad have also advanced slightly, closing at £92 10s. for spot and £93 for three months.

A. K. Shriver, of Baltimore, Md., appeared before the Ways and Means Committee of the House on February 21st in support of the Stump Bill admitting block tin free of duty. Mr. Shriver gave the purposes for which block tin was used and statistics of the amount of tin cans and block tin used annually. The members of the Committee present favored the bill, and Mr. Stump said after the meeting that he was confident the measure would receive a favorable report at an early day.

Lead.—The market is firm but dull at 3·95. Western smelters are offering very little. The English market was very much depressed, and considerable business took place at £9 5s., but then a better feeling was evinced, and £9 7s. 6d. has since been paid for Spanish and £9 10s. for English lead.

Chicago Lead Market.—The Post Boynton Strong Company telegraph us as follows: "The market has been quiet and dull at 3·75c. asked. Sales foot up 200 tons. At the close demand is nil."

St. Louis Lead Market.—The John Wahl Commission Company telegraph us as follows: "Lead is very quiet with trading unusually light; values remain unchanged at 3·70c. for both common and refined. Offerings are still restricted."

Spelter is rather dull and depressed, and we must lower the quotation to 4·30 New York. The foreign markets are unaltered.

Antimony remains dull; Cookson's at 10¾c., L. X. 10½c., and Hallett's 9½@10c.

Nickel is unchanged, prices varying from 48@52c

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Feb. 24, 1893.

Pig Iron.—There is absolutely no change to report in the pig iron market. The same conditions which have prevailed for some time past continue, he features, or rather, the lack of features by which the market has been characterized this year, is unchanged in every respect. Consumers maintain their policy of a hand-to-mouth trading, buying just enough to supply their immediate wants. Nobody expects iron to advance in price in the near future, and there is no anxiety on the score of a scarcity of supplies or difficulty of delivery. No new business of any consequence is reported and the aggregate remains about the same. Prices are as follows: Southern, ex steamer, No. 1 F., $14 50@$15; No. 2 F., $13.50@$14; Gray Forge, $13; Northern, tidewater, No. 1 X , $14.75@$15; No. 2 X., $13.75@$14; No. 2 plain, $15.50@$14.

Pig Iron Production During Weeks Ending February 18th, 1892, and February 18th, 1893, and During Both Years to These Dates.

Fuel used.	Week ending Feb. 18, 1892.		Week ending Feb. 18, 1893.		From Jan., '92.	From Jan., '93.
	F'ces.	Tons.	F'ces.	Tons.	Tons.	Tons.
Anthracite.	94	38,970	70	32,600	272,790	228,600
Coke.	164	138,900	137	131,600	972,930	921,200
Charcoal	55	11,820	39	8,900	82,740	62,300
Totals	313	189,780	246	173,100	1,328,460	1,212,100

Prices: Southern, ex-steamer No. 1 F., $15.26; No. 2 F., $14.26; No. 3 F., $13.76; Gray Forge, $13 01, Northern, tide water, No. 1 X, $15; No. 2 X, $14; No. 2 plain, $13.50; Gray Forge, $13. Southern irons are quoted, nominally, 26c. higher than Northern.

Spiegeleisen and Ferromanganese.—There is nothing doing in either ferro or spiegel. The market continues dull and featureless. Quotations are: Ferro, $56.25@$56.75; Spiegel, $25.50@$26.

Steel Rails.—There is no activity in the rail market, only one sale of any importance, 3,000 tons, being reported. The price remains $29 at tidewater.

Rail Fastenings.—There is nothing doing in rail fastenings. Prices rule as follows: Fish and angle plates, 1·55@1·65c. at mill; spikes, 1·90@2c.; bolts and square nuts, 2·40@2 70c.; hexagonal nuts, 2 70@ 2·80c. delivered.

Merchant Steel.—The merchant steel market continues quiet. A slightly improved demand is reported and prices are a shade firmer. Quotations this week are: Mushet's special, 48c.; English tool steel, 15c. net; Americal tool steel, 6½@7½c; special grades, 13@18c.; crucible machinery steel, 4·75c.; crucible spring, 3·75c.; open hearth machinery, 2·25c.; open hearth spring, 2·30c.; tire steel, 2·25c.; toe calks, 2·25@2·50c.; first quality sheet, 10c.; second quality sheet, 8c.

Structural Iron and Steel.—There has been a fair inquiry for structural iron and steel during the week and several sales are reported, though with a single exception contracts have not been large. We quote: Beams, 2·30@2·55c., except for 20-in. beams, which are 2·75c.; angles, 1·95@2·15c.; sheared plates, 1·90@2·10c.; tees, 2·30@2·60c.; channels, 2·35@2·50c., universal plates, 2@2·10c.; bridge plates, 2@2·10c.; steel hoops, 1·90@8c. All on dock.

Buffalo. Feb. 23.

(Special Report by Rogers, Brown & Co.)

An interesting and unchanged condition is all that can be said of this market. Prices have not shown any more strength, and demand has been light. We quote on the cash basis f. o. b. cars Buffalo: No. 1 X foundry strong coke iron, Lake Superior ore, $14.50; No. 2 X foundry strong coke iron, Lake Superior ore, $13.75; Ohio strong softener No. 1, $14 50; Ohio strong softener No. 2, $14; Jackson County silvery No. 1, $17@$17.30; Jackson County silvery No. 2, $16.30@$16.80; Lake Superior charcoal, $17.25; Tennessee charcoal, $18; Southern soft No. 1, $14; Alabama car wheel, $19; Hanging Rock charcoal, $20.50.

Chicago. Feb. 23.

(From our Special Correspondent.)

Despite the large tonnage of crude iron placed this month, with several more days yet to hear from, no improvement in values is noted, and furnacemen and agents of Northern coke iron look for no betterment in prices in the near future, though should conditions prove more favorable the large sales effected during February will have done much to pave the way, but it is admitted that the prospect in that direction is not reassuring. In Southern pig iron the smaller companies have again weakened and some good sized quantities have been sold, but as one agent remarked: "Each sale made was the signal for a cut on the next inquiry offering." While it is true that the concessions are not of great moment they indicate the general downward trend which the larger furnaces so far hesitate to follow, dreading the demoralization which might ensue. Finished material of all kinds is slow to improve, and while there is a moderate amount of business doing in some branches, others are quiet, plates and sheets probably more so than anything else. Western railroads so far have placed no large blocks of steel rails, but that there is a good inquiry and a large tonnage is looked for shortly.

Pig Iron.—A very fair volume of business was entered last week by the local coke furnace companies, but it was not as heavy as the week previous. There are still a number of negotiations pending and the remainder of the month will probably show some additional large sales. Current rates are steadier, and it is generally conceded that for the present the downward tendency has been checked. On the other hand, it is not anticipated that prices will be any higher, without there should be a sudden rush for iron, and this is not expected. In Southern iron most of the large deals usually placed in this market have been closed and there are only a few left on which buyers expect to get unusually low prices, judging from the active bidding. Lake Superior charcoal iron is in some inquiry by car wheel makers and a few orders secured; more business is looked for early in March.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, $16,50@$17.25; Lake Superior coke, No 1, $13.50@$14.50; No. 2, $13.00@$13.50; No. 3, $12.75@$13; Lake Superior Bessemer, $14.25; Lake Superior Scotch, $14.25@$14 75; American Scotch, $16.25@$16.75; Southern coke, foundry, No. 1, $14.25; No 2, $13.35; No. 3, $13.00; Southern coke, soft, No. 1, $13.35; No. 2, $13.00; Ohio silveries, No. 1, $16.50; No. 2, $16.00; Ohio strong softeners, No. 1, $16.75; No. 2, $16.25; Tennessee charcoal, No. 1, $17; No. 2, $16.50; Southern standard car wheel, $20@$21.

Steel Billets and Rods.—Both these specialties are quiet at $23.50 for the former and $32.50 for the latter.

Structural Iron and Steel.—There is a good deal of building construction pending on which figures have been made, but for some reason contractors are slow to close. Bridge work is coming into the market and outlook more encouraging. Quotations, car lots, f. o. b. Chicago, are as follows: Angles, $1.90@$2; tees, $2.15@$2.25; universal plates, $1.95@ $2; sheared plates, $1.95@$2; beams and channels, $1.95@$2.25.

Plates.—Local demand for mill or warehouse lots is light. An inquiry for 1,800 tons for the Pacific Coast is noted. Steel sheets, 10 to 14, $2.30@$2.40; iron sheets, 10 to 14, $2.20@$2.30; tank steel, $1.90 @$2; shell iron or steel, $2 50@$2.75; firebox steel, $4.25@$5.25; flange steel, $2.75@$3; boiler rivets, $4 @$4.15; boiler tubes, all sizes, 60%.

Merchant Steel.—New business is light, except for small lots of 50 to 100 tons for piecing out contracts. Jobbing demand is fair and in many new lines soft steels are replacing iron. Tool steel is showing more activity. Quotations are: Tool steel, $6.50@$6.75 and upward; tire steel, $2@$2.10; toe calk, $2.30@$2 40. Bessemer machinery, $2.10@ $2.20. Bessemer bars, $1.70@$1.75; open hearth machinery, $2.30@$2.40; open hearth carriage spring, $2.10@$2.20; crucible spring, $3.75@$4.

Galvanized Sheet Iron.—No increased activity is looked for until the weather moderates. Agents' stocks are in good shape. Discounts are easy at 70 and 10% off on Juniata and 70 and 15% off on charcoal, and jobbing quantities at 70 and 5% off on the former and 70 and 10% off on the latter.

Black Sheet Iron.—Manufacturers report a better inquiry from jobbers and consumers. Quotations on iron sheets are 2·85c. for No. 27, common; steel sheets are 2·35c. Jobbers quote 3@3·10c. for iron and 3·10@3·15c. for steel, same gauge.

Bar Iron.—Demand during the past week has been more active not only from consuming manufacturers but jobbers also have placed a fair amount of business. Orders from car builders are light; we hear of one inquiry for 500 tons of high specification iron. Mills generally quote 1·57½c. and some ask 1·60c. The feeling generally is a little stiffer and 1·55c. is rarely quoted. Jobbers quote 1·70@1·75c. base for iron or steel.

Steel Rails.—A very fair run of orders for fair to medium sized quantities is reported by local mills, but so far no round lots have been secured. Several are pending but for some cause unexplained they have not yet gone through. Quotations remain steady at $30@$32 as to quantity and delivery. General orders for splice bars were placed this week and mills making a specialty of these note a good inquiry. Prices are: 1·65@1·70c. for iron and steel splice bars; track bolts, square nuts, 2·55c.; hexagon, 2·65c.; spikes, 2·05@2·10c. according to style.

Nails.—Feb. 15.—The steel cut-nail makers adopted the wire card at their meeting at Pittsburg, and the change is favorably received by the Western trade. Wire nails are quoted at $1.57½ base Chicago from mill, and $1.65@$1.70 from store. Steel cut are $1.50 base Chicago from factory and dull. Jobbers quote $1.65@$1.70 new card.

Scrap.—The improvement though slow is steady, but is confined to small lots and prices remain easy. Railroad, $15.50; No. 1 forge, $15; No. 1 mill, $9.50; fish plates, $16.50; axles, $19; horseshoe, $16; pipes and flues, $7; cast borings, $6; wrought turnings, $8; axle turnings, $9.50; machinery castings, $10; stove plates, $6.50; mixed steel, $10.50; coil steel, $15; leaf steel, $15.50; tires, $14.50.

Old Material.—Consumers of iron rails are beginning to buy more directly from railroads and transactions are hard to trace. Quotations are easy at $18.50. Steel rails are quiet at $11.25@$13.50 according to length. Car wheels are steady at $14.75.

Louisville. Feb. 18.

(Special Report by Hall Brothers & Co.

The market remains without any essential change for the past week. One or two good sized orders have been reported at very close figures, and in one instance a sale is said to have been made at such a shaded price that it is doubtful about its being confirmed by the furnace for whose account the transaction is supposed to have been made. Beyond

these few cases there is nothing else of interest to be reported. Stocks are said to be accumulating.

Hot Blast Foundry Irons.—Southern coke No. 1, $13.50@$13.75; Southern coke No. 2, $12.50@$12.75; Southern coke No. 3, $12@$12 25; Southern charcoal No. 1, $16@$17; Southern charcoal No. 2, $15.50@$16.

Forge Irons.—Neutral coke, $11.50@$12; mottled, $11@$11.25.

Car Wheel and Malleable Irons.—Southern (standard brands), $20@$21; Southern (other brands) $18.50@$19.50; Lake Superior, $19.50@$20.50.

Philadelphia. Feb. 23.

(From our Special Correspondent.)

Pig Iron.—The market is strong considering the amount of iron offered and at furnace. Best makes are not to be had for early delivery and there is a decided anxiety among users of the firm irons to secure acceptance of orders for spring delivery. Forge irons are weak at $12 75@$13. Buyers and sellers are watching the market with unusual vigilance, though both sides declare there is no probability of sudden changes. No business in Bessemer.

Steel Billets.—Early in the week the market was decidedly dull, but yesterday and to-day lots were sold at an advance of 25 cents over lowest quotations last week and some parties are pretending to ask 50 cents more, but the average price is $23.75@$24 50. The makers feel things are working in their favor. The week's business has been of moderate proportions, but the prospects are better for an early improving trade.

Muck Bars.—Production is being cut down still further. No sales have been heard of for several days, and large January contracts will soon be completed.

Merchant Iron.—There is no material change in the situation over a month ago. After all, mill men think the spring demand will compensate very much for the dull winter.

Nails.—Demand for steel cut and wire nails is not heavy. We hear New York parties are cutting prices, but in this market the new price list is being lived up to.

Sheet Iron.—The good demand continues and all the mills are busy, card rates for refund being paid only on small lots.

Skelp.—An improving demand is reported to-day.

Plate.—Despite the large orders placed, the manufacturers are calling for more, and taking very low prices indeed. So low that many large prospective buyers feel perfectly safe in placing orders slowly. Iron and steel tank plate, 1·80; steel flange, 2·30.

Structural Material.—The large orders secured have in no wise lessened the anxiety of makers to secure more business—at very low rates, lower than 2c. for beams, tees and channels.

Steel Rails.—Quoted at $29. No large orders this week, though one for a Southern road may be placed any hour.

Old Rails.—Slightly advanced in price and quoted at $19 for iron.

Pittsburg. Feb. 23.

(From our Special Correspondent.)

Raw Iron and Steel.—Trade is somewhat irregular, for while there is activity in some branches at steady prices there is dullness and weakness in others. In pig iron a reasonably good demand was the rule, not the exception. Bessemer pig commands the most attention; the sales show very conclusively that the consumption of Bessemer is the largest in the history of the trade. The next in order for large consumption are steel billets, which have grown in magnitude during the past few years. All this goes to show that steel is taking the place of iron with rapidity.

A few years ago the difference in cost of grey forge and Bessemer pig was from $2.50@$3 per ton in favor of the latter. How is the situation at the present time? The difference is less than half it was at the time mentioned. The improved machinery that is being introduced has worked wonders in the manufacture of steel. We see it noted that a patent has been applied for that will reduce the making of steel over one dollar per ton.

Grey forge iron has been steady for some time at uniform prices for standard grades. Buyers, as a rule, are unwilling to take large stocks, but the producers are not concerned at this, professing a belief that prices must go higher rather than lower. The current prices are $12.25 cash. The valley furnacemen are reported to have disposed of several good-sized blocks of Bessemer within a few days, report says, at $13 at the furnace; this would be a good price compared with certain sales that were made since the first of the month.

There is a large amount of activity in the Shenango and Mahoning Valley; iron not sold is being piled up in the yards to await the good time that we have all been waiting for. A leading Eastern dealer has this to say: "There is plenty of business, and it might just as well be done at fair prices as at the ruinous rates which are now prevailing, but everybody is afraid that somebody else will quote a low figure, and to be sure of not being beaten each for himself tries to get the first start. This may seem to be an exaggerated statement, but those who are in the trade will recognize it as being in accordance with facts. Prices of finished material are lower to-day than they ever were. Under such conditions it is useless to speculate on what the next turn may be, but at this writing there is no question whatever that orders for bars, plates, shapes, etc., can be placed at lower figures than ever before, and apparently without any immediate prospect of improvement." Pig Iron.—There is nothing in the situation to indicate any special movement, the supply being too large to permit of an advance, and the demand large enough to prevent a decline. The usual irregularities are met with, however, such as extra low prices when there is a forced sale, and comparatively high prices when special brands are called for. In other words, the price depends a good deal on which side is most anxious to do business, the market being one that will not bear much forcing.

The sales are as follows:

Coke Smelted Lake and Native Ore.		
5,000 Tons Bessemer, April, May, June	$13.40	cash.
4,000 Tons Bessemer, Valley Furnace	13.00	cash.
3,000 Tons Bessemer, Feb., March	13.50	cash.
2,500 Tons Bessemer, next 3 mos	13.40	cash.
2,500 Tons Bessemer, March, April	13.35	cash.
2,000 " ons Bessemer, Feb., March	13 50	cash.
1.500 Tons Bessemer, Feb., March	13.60	cash.
1.000 Tons Grey Forge	12.25	cash.
1,000 Tons Mill Iron	12.25	cash.
1,000 Tons Bessemer, prompt	13.65	cash.
1,000 Tons Bessemer, prompt	13.60	cash.
1,000 Tons Grey Forge	12.25	cash.
500 Tons Grey Forge, all ore	12.50	cash.
500 Tons No. 1 Foundry	14.00	cash.
500 Tons Grey Forge, all ore	12.75	cash.
200 Tons No. 1 Foundry	14.25	cash.
200 Tons No. 2 Foundry	13.00	cash.
Charcoal.		
100 Tons Cold Blast	26.00	cash.
75 Tons Cold Blast	26 50	cash.
75 Tons No. 2 Foundry	18.50	cash.
75 Tons No. 2 Foundry	18.25	cash.
50 Tons No. 1 Foundry	20.50	cash.
Steel Blooms, Billets and Slabs.		
3,500 Tons Billets and Slabs, next 3 mos, at mill	22.00	cash.
2,000 Tons Billets Feb., March, at mill	22.25	cash.
1.500 Tons Billets March, April, at mill	21.85	cash.
1,500 Tons Billets March, April, at mill	22.25	cash.
1,000 Tons Billets April	22.35	cash.
500 Billets, at mill	21.75	cash.
Muck Bar.		
500 Tons Neutral	24.25	cash.
500 Tons Neutral	24.30	cash.
500 Tons Neutral	24.25	cash.
Iron Skelp.		
480 Tons Sheared Iron, declined	1.70	4 m.
420 Tons Wide Grooved, declined	1.50	4 m.
300 Tons Narrow Grooved, declined	1.50	4 m.
Steel Skelp.		
1,000 Tons Wide Grooved, advanced	1.45	cash.
Ferro-Manganese.		
50 Tons, 80 per cent domestic	59.50	cash.
50 Tons, 80 per cent. imported	59.50	cash.
Steel Wire Rods.		
400 Tons 5 gauge American Advance	30.40	cash.
Blooms, Billets and Bar Ends.		
350 Tons Billet and Bar Ends	15.00	cash.
Sheet Bars.		
350 Tons Sheet Bars, at mill, Advanced	28.00	cash.
Old Iron and Steel Rails.		
500 Tons Steel Mixed Lengths	15.00	cash.
500 Tons Steel Mixed Lenghs	15.25	cash.
500 Tons American T's, Youngetown	19.75	cash.
Scrap Material.		
350 Tons No. 1 R. R. W. Scrap, net	16.25	cash.
300 Tons Cast Scrap, gross	12.00	cash.
200 Tons Crucible Steel, net	20.50	cash.
100 Tons Coil Springs, gross	18.00	cash.
50 Tons Leaf Steel, gross	20.00	cash.
50 Tons Wrought Turnings, net	11.00	cash.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Feb. 24th.

PRODUCTION OF BITUMINOUS COAL for week ending February 18th and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

	1893. Week.	1893. Year.	1892. Year.
Phila. & Erie R. R.	2,778	19,128	11,652
Cumberland, Md.	79,256	435.223	442,542
Barclay, Pa.	1.573	11,641	32,713
Broad Top, Pa.	17,661	107,185	84,760
Clearfield, Pa.	85,129	546,729	508,032
Allegheny, Pa.	25,887	145,174	157,532
Beach Creek, Pa.	31,786	327,246	331,659
Pocahontas Flat Top	49.559	335,223	358,930
Kanawha, W. Va.	65,897	429,844	323,588
Total	359,506	2,357,293	2,251,408

WESTERN SHIPMENTS.

	1893. Week.	1893. Year.	1892. Year.
Pittsburg, Pa.	25,159	184,899	193,624
Westmoreland, Pa.	62,464	280.467	260,690
Monongahela, Pa.	12,032	111,575	66,212
Totals	99,655	576,941	520,526
Grand totals	459,161	2,934,234	2,771,934

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending February 18th, 1893, and year from January 1st, in tons of 2,000 lbs.: Week, 124,424 tons; year 761,610 tons; to corresponding date in 1892, 840,598 tons.

Statement of shipments of anthracite coal for month of January, 1893, compared with the corresponding period last year. Compiled from the returns furnished by mine operators:

	January, 1893.	January, 1892.	Difference.
Wyoming region	1,875,094.05	1,520,927.06	Inc. 354,166.19
Lehigh "	407,794.14	396,392.12	" 11,402.02
Schuylkill "	786 690.10	934,166.17	Dec. 147,476.07
Totals	3,069,579.09	2,851,486.15	Inc. 218 092.14

The stock of coal on hand at tidewater shipping points, January 31st, 1893, was 532,375 tons; on December 31st, 1892, 657,868 tons; decrease, 125,493 tons.

Eastern competitive tonnage, including all coal which, for final consumption or in transit, reaches any point on the Hudson River or Bay of New York, or which passes out of the capes of the Delaware:

1892	13,593,541 tons
1891	13,313,719 "
Increase over 1891	279,822 tons

Anthracite.

Naturally the appointment last Monday of receivers of the Philadelphia & Reading Railroad Company and the Philadelphia & Reading Coal and Iron Company has been the chief subject of discussion in the coal trade of this city. A. A. McLeod, president of the Reading companies; E. P. Wilbur, president of the Lehigh Valley Railroad; and Edward M. Paxson, Chief Justice of the Supreme Court of Pennsylvania, were appointed receivers and issued the following official circular marked "No. 1":

"The undersigned have this day taken possession of the property and effects of the Philadelphia & Reading Railroad Company and the Philadelphia & Reading Coal and Iron Company, as receivers of said incorporation, appointed by an order of the Circuit Court of the United States for the Eastern District of Pennsylvania. The business of both companies will be conducted by the receivers, and all officials, agents and employés of the companies are continued in their respective positions. All overdue wages of both companies will be paid in cash, due notice being given of the times and places of payment."

A more elaborate statement, especially as concerns the finances of the companies, was expected, but the receivers are not yet prepared to impart this information. Guesses to the extent of the Reading's floating debt are numerous and varied.

President McLeod gave the following explanation of the crisis: "Our credit was attacked in a way that made it impossible for us to meet our obligations, and we had the receivership established before the property was further injured. I want to say that we have coal on hand now worth more than enough to pay our floating obligations, and there will be no trouble in carrying on the company's finances now. The trouble was brought about by the fact that we were doing an enormous business on a small capital and when this attack was made on us it hurt our credit so that we could not borrow money. The great menace to the Reading is the previous mortgage. Under its terms the company is bound hand and foot. The mortgage prescribes exactly how the accounts shall be kept, and directs that the balance on hand at the end of the year shall be paid to the bondholders. Now we earned the preference interest last year under the terms of the mortgage, but, as a matter of fact, our equipment is so poor that we were obliged to spend as much in order to earn it. There are 6,000 cars on the line that are almost worthless. Our locomotives also are not powerful or numerous enough to handle our business. We now expect to remedy this, for as receivers we can do some things which we could not before. We will put the property in the best possible condition, so that it will earn all that there is in the trade. The Lehigh Valley will remain with us as before. The New England system will be maintained."

Mr. McLeod's plans to secure a hold in New England were calculated to strengthen the Reading's coal business in that section, but the financial difficulties in the way could not be overcome. Influential enemies stood in the path and successfully checked the Reading's plans.

The relations of the Lehigh Valley Railroad toward the Reading have not been changed. The board of directors of the first company has given to the Reading receivers formal consent to the continuance of the lease under the receivership, and the position which the two companies have occupied in respect to each other during the past twelve months is confirmed.

It is yet too early to determine the effect of the change in the status of the Reading company on the coal trade. The coal trade just now is quiet and dull, just as it was a week or two ago. It is natural that considerable uncertainty as to the future should prevail, but this uncertainty has been experienced for some time. The demand keeps up as usual. Consumers have all along bought coal from hand to mouth, purchasing only what sufficed for immediate requirements and no more. Coal is not being stocked in the yards, which in view of the high prices shows common sense, but nevertheless it is moving freely enough on account of the exceptionally cold weather, and there has been no cancellation of orders.

Prices have undergone no change. They are well maintained and we hear of no cutting save, perhaps, for coal that is dirty or for some other reason devoid of special significance.

Quotations are:

	Broken.	Egg.	Stove.	Chestnut.
Hard White Ash	$4.10	$4.50	$4.75	$4.65
Free " "	4.00	4.40	4.75	4.65
Shamokin	....	4.60	4.95	4.65
Schuylkill R. A.	....	4.65	5.10	4.90
Lorberry	....	4.65	5.10	4.90
Lykens Valley	5.10	5.65	6.15	5.25

Spring is approaching, when the normal demand always declines. Speculation is rife as to the reduction in price which is bound to be made as an inducement to dealers to stock up coal during the slack months. It is in this way that the collieries have been enabled to continue in operation at a season of the year when there was little demand for coal. That a reduction in prices must be made is the prevalent opinion.

Further than this it is premature to say how different from last year 1893 will be. The railroads do not object to high freight rates; producers are perfectly willing to continue to receive high prices for their coal, and a return to the old order of things when agreements to restrict the production for the current month were made and broken, and prices were "fixed" and "cutting" was prevalent. The best way for the consumer is not to entertain hopes that he will buy coal very cheap this year nor yet to fear that the very high prices of 1892 will prevail in 1893. Simply await developments and "lay low."

The coal and coke tonnage of the Pennsylvania Railroad for the 11 months ending November 30, 1892, was as follows in tons of 2,240 lbs.:

	Coal.	Coke.
Originating on Pennsylvania R. R. lines	11,500,114	4,189,683
Received from connecting lines	8,879,584	395,430
Total	20,379,698	4,585,113
Delivered to connecting lines or reshipped by water	12,465,235	2,892,622
For consumption at local points on Pennsylvania R. R.	7,914,463	1,692,491

Tonnage of coal and coke moved for the company's use is not included in this statement.

Bituminous.

The shipments of soft coal continue as for the past two weeks. They are not as great as the trade demands and it is only by concentrating shipments to one point that shippers are able to keep their contracts. Baltimore is now open and Philadelphia is beginning to show signs of reviving, although no great amount is being shipped from either. Freights are lower, as follows: Philadelphia to Sound ports, $1.05; to Boston, $1.15. Baltimore, Norfolk and Newport News, 10c. above Philadelphia rates.

Shippers do not seem much inclined to make contracts to as great extent for next year as they did a year ago. They are deterred by the fear that the same conditions which have prevented from carrying out their contracts fully may again prevail. No stocks are accumulating.

There seems to be a feeling in the trade that better prices will obtain for the coming year. The great projected "combination" remains in "the air," and is no nearer materialization, but there are a number of small "combines" in various districts where the shippers have united for the purpose of doing what all "combinations" great or small are organized to do. This and the fact that there is a shortness of of coal in many quarters have caused a firmer market, and the demand, owing to the conditions of the season, is good.

Notice has been received that the Pennsylvania Railroad will, on April 1st, advance the freight rates on soft coal between the mines and tidewater 25c. per ton. This action is supposed to be the outcome of a combination with Reading and other soft coal carriers. The circular rate during the past has been $2 per ton. It is said that the Reading Railroad cut freights, compelling competitors to establish a 25c. rebate, have reduced the actual rate to $1.75. This advance is more in the nature of a restoration. The tariff on April 1st will be $2 per ton with no rebates.

Boston. Feb. 23.

(From our Special Correspondent.)

The talk of the hour is the passing of the Reading Railroad Company into the hands of receivers. Coal dealers here have confidence in President McLeod, of the Reading, and think that the receivers' policy will be to sell coal at a profit.

As for trade, at present it is good and will continue so for the next month, judging from present indications. Prices are held firm by the companies and are apt to be until there is a surplus above ground. This is not expected very soon, which fact gives the trade considerable confidence in the market.

We quote, f. o. b. prices net New York: Stove, $4.75; egg, $4.40; free broken, $4; chestnut, $4.65; Lykens Valley (at Philadelphia) broken, $4.85; egg, $5.45; stove, $6, and chestnut, $5.

Bituminous coal is still scarce and firm. Receipts are freer than they were, yet large consumers are quite eager for supplies. George's Creek on cars here is worth $4.50@$4.65; and Clearfield $4.15.

Freight rates remain firm, and have changed but little. They are: From New York, 75@90c; from Philadelphia, $1.25@$1 40; from Baltimore, $1.25@$1.40; from Newport News, $1. Owing to the dearth of tonnage at Baltimore, it would not be at all surprising to see rates from there advance at any time.

As to be expected, some few retail coal dealers have spoiled the fun for the rest by cutting prices. Some of these cutters would not be satisfied if they had the earth. They were getting handsome prices on their coal, and yet they wanted their neighbors' customers. The cutting, however, worked to not only their own detriment, but, sorry to say, to the rest of the trade. When it was discovered, the retailers held a meeting and put down prices 50c. per ton on all grades of anthracite. This was last Monday. And oh! how some of the trade have regretted the occurrence, with such a week as we have just had. Cold and blizzardy, with a heavy demand for coal; why, they could have easily sold large quantities at old prices had a few thickheads in the trade used common sense.

The reduction, however, only hurts the retailer and on the whole he has had a very soft thing of it since the year opened at the expense of the poor and rich public, especially the former. Retail coal dealers at times do not seem to realize that some one else would like a show to live as well as themselves. The new schedule of prices which went into effect Monday are: Stove, $6 50; nut, $6.50; egg, $6.25; furnace, $6; Franklin, $7.75; Lehigh egg, $6.50; Lehigh furnace, $6.25; soft coal, $4.25@$5. Wharf prices 50c. per ton less.

The receipts of coal at the port of Boston for the week ending February 18th were 23,066 tons of anthraciet, and 17,049 tons bituminous against 30,142 tons of anthracite and 18,475 tons of bituminous for the corresponding week last year. Since January 1st th receipts have been 133,400 tons of anthracite and 98,352 tons of bituminous against 195,358 tons of anthracite, and 76,749 tons bituminous for the corresponding time last year.

Buffalo. Feb. 16.

(From our Special Correspondent.)

We have enjoyed a renewal of winter in this section of the country to the extent of severe cold, sharp winds, a 20-hour blizzard with a 49 mile an hour gait, railroad traffic badly obstructed and pedestrianism at a discount, during several days past. The persons who have really enjoyed the weather were the coal dealers and the gas fuel companies. Anthracite coal is active and prices are unchanged.

Bituminous coal is in good request and steadier in consequence of the severe weather which has slightly decreased the number of cars arriving, and dealers will not make any concession.

Reports from points of distribution around Buffalo indicate good business and depleted stocks. Dealers admit that they have done a larger trade this winter than has been the case for years past, and at satisfactory figures so far as profits are concerned.

Bituminous coal is selling in Buffalo from $1.50 to $2.35 per 2,000 lbs, in car lots to consumers on track; ranging from slack to screened lump.

Indications point that in the near future the trolley system will be adopted for transportation purposes on the Erie Canal.

The Cataract Canal Construction Company and the Hydraulic Canal Company, of Niagara Falls, will unite in developing the power of the falls for electric and heating purposes.

The Queen City Gas Company, with a capital of $50,000, has been organized to manufacture and supply gas for lighting the streets and buildings of our city.

The New York, Ontario & Western Railroad Company has bought the Reading Coal Company's trestle at East Buffalo for their local trade, under the management of sales-agent R. E. McWilliams.

The excitement among our coal men and citizens relative to the Reading Company's troubles still continues.

Chicago. Feb. 23.

(From our Special Correspondent.)

The sensation of the week in Chicago as well as in New York has been the appointment of receivers for the Reading system. The larger shippers and coal dealers of Chicago do not think that that fact will have any effect on the anthracite coal trade this season, either as regards price or sales. The feeling here from the first startling news received has been that it would be a good thing for the anthracite interests, as under the new régime, or receivership, the stability of the price of coal would be assured, and the prospect that the Reading will now be enabled to hold its own as against the other members of the late combination. Many jobbers and dealers are in hopes that the situation will remain unchanged, as they realize that the past season has been one of steady maintenance of prices which has put a stop to the ruinous competition so prevalent in former years. They argue that a firm market such as has continued during the past six or eight months has been a benefit to the entire trade; but there are others who differ. Careful estimates have been made of the amount of coal in stock here, and at the outside there is not to exceed 260,000 tons on dock and in shipping yards. An average month's supply during the winter or cold months is 300,000 tons a month, so that there is now barely thirty days' supply. In this connection it is well to bear in mind that all rail coal is coming forward fairly well, so there will probably be sufficient to take care of all business between now and the end of the season, or until the opening of navigation, all providing the railroads handle the coal promptly. Wholesale trade is in good shape, orders, though small, are frequent, and as March is always a good coal selling month, shippers look for a steady trade for some time. Retail trade is active and the cold weather creates a steady demand from the smaller consumers.

Bituminous coal of all kinds continues scarce, though there is no absolute stringency. The railroads seem utterly unable to recover from the condition of affairs forced upon them by the blockades of January and early this month. From all quarters we hear the call for empty cars from mines, which are either sidetracked or temporarily lost sight of. Delayed shipments en route are also causing serious annoyance, and confiscation of coal by carrying roads is nearly as common as it was last month. The threatened switchmen's strike on all roads centering here makes rather a gloomy outlook for a satisfactory transaction of business in a wholesale way, owing to scarcity of cars. The heavy snowstorm of last week has further hampered the roads, so that they are at present unable to move car coal or empties with any degree of promptness, hence the supply continues of the hand-to-mouth character such as has been noticeable for the past sixty days. All coal is fetching full circular, and some kinds of high steam grades command a premium of from 10c. to 25c. per ton on track.

Coke is more active and supply is better than it has been and shipments are becoming more regular.

Quotations are: $4.65 furnace; $5.05 foundry, crushed; $5.40 Connellsville; West Virginia: $3.90, furnace, $4.10 foundry; New River foundry, $4.75; Walston: $4.65 furnace, $5 foundry.

Circular prices are at the following rates: Lehigh lump, $6.50; large egg, $5.85; small egg, range and chestnut, $6.10. Retail prices per ton are: Large egg, $7.25; small egg, range and chestnut, $7.25.

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are: Pittsburg, $3.40; Hocking Valley, $3 10; Youghiogheny, $3.25; Illinois block, $2; Brazil block, $2.60@$2.75.

Pittsburg. Feb. 23.

(From our Special Correspondent.)

Coal.—The situation is practically unchanged. The strike still goes on. The miners say no men shall work the mines but themselves. We had a good boating stage most of the time since the first of the year; the entire shipment by water was 3,288,000 bushels, most of which was mined last year. Coal shipments for January and February, 1892, reached 13,908,000 bushels. Pittsburg coal is no longer king. The Q. & C. railroad is running any quantity of excellent coal into Cincinnati and Louisville, and the new mines recently opened up in Kentucky are supplying Louisville and other Southern points with a very fair quality of coal. It is only a question of time when the Pittsburg shippers will have to quit business in this direction; the market for their coal is being taken away from them. The coal operators have decided to send 300 barges to the Kanawha to be loaded at once. The spring coal shipment has been a large failure as the figures noted above show ample evidence. The coal men must find employment for their steamboats and barges, if not here at some other place.

Connellsville Coke.—The trade during the week shows a slight improvement over the preceding one. The increase in production was slight, but the shipments were the largest of the year. This indicates that the car supply is improving. The operators will make an effort to clear their yards of stock coke before raising the price to the old figures. Nearly every yard in the region is piled with stock coke, and to get rid of it and load their regular weekly production will require a good supply of cars. The demand for foundry coke at present is brisk. The crushed coke trade did not fall off any after last month's severe weather. The H. C. Frick Company is behind with its orders and has both of its crushers at Redstone and Standard running six days a week. Our report shows 13,130 ovens in blast and 4,199 idle, with an estimated production of 131,480 tons, distributed as follows: To Pittsburg, 1,875 cars; west of Pittsburg, 3,470 cars; east of Pittsburg, 1,595 cars; total, 6,940 cars. Pittsburg shipments increased 40 cars; Eastern shipments increased 88; Western shipments, 124 cars; total, 252 cars.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Feb. 24.

Heavy Chemicals.—There has been absolutely no change in the conditions prevailing in the heavy chemical market as outlined in our last week's report. Generally speaking the market continues quiet and devoid of features of intrinsic interest. Caustic soda is scarce and the demand is rather in excess of the spot supply. Carbonated soda ash also continues limited as to stocks on the spot, especially 48%. Alkali is quiet. Bleaching powder is firm; there are rumors of an advance abroad. Prices show little or no change from last week. We quote: Caustic soda, 60%, 2·95@3·10c.; 70%, 2·70@2·80c.; 74%, 2·72½@2·82½c.; 76%, 2·80@2·90c. Carbonated soda ash, 48%, 1·40@1·60c.; 58%, 1·35@1·40c. Alkali, 48%, 1·35@1·40c.; 58%, 1·20@1·30c., according to package. Sal soda, English, on the spot, 1·05@1·10c.; American, 90@95c.; bleaching powder, 2·37½@2·62½c.

Acids.—What was said in this column last week anent the acid market is as pertinent to-day as it was then, for no change has taken place, and the same conditions prevail. Manufacturers are busy on their contracts, and the jobbing demand continues about the same. There is no change in prices, and we quote: Acid, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, $1.75@$2.25, according to quality; muriatic, 18° 90c.@$1.10; 20°, $1@$1.25; 22°, $1.25@$1.50; nitric, 40°, $4; 42°, $4.50@$4.75; sulphuric, 90c.@$1.10; mixed acids, according to mixture; oxalic $6.15@$6.50. Blue vitriol is quoted all the way from $3.25 to $3.75; glycerine for nitro-glycerine, 11½@12½ according to quality and quantity.

Brimstone—The brimstone market is quiet. Quotations are as follows: Best unmixed seconds, on the spot, $20.50; to arrive, April-May shipments, $19.75@$20.25. Best seconds, 75c. lower.

Fertilizing Chemicals.—The good demand for the various fertilizers which we reported in our last issue continues, and it has caused an advance in the ammoniates by increasing the scarcity of available supplies, which already existed. Both here and in West dealers complain of the stringency. During the week under review many sales have taken place

at the advanced prices. Our quotations this week are as follows: Sulphate of ammonia, on the spot $3.05@$3.10 for bone goods and $3.15@$3.20 for gas liquor. Dried blood, $3.05@$3.10 per unit for high grade and $3@$3.05 for low grade; acidulated fish scrap, no stocks on hand; dried scrap is scarce and is quoted at $31 f. o. b. fish factory. Azotine, $2.90 @$3. Tankage, high grade, $30@$32; low grade, $29@$31. Bone tankage, $23.50@$24; bone meal, $23@$25.

Phosphate Rock—There is nothing of interest to report of the phosphate market this week. Quotations are unchanged: $4.75 for 55% rock, free alongside at Charleston.

The shipments of phosphates from Florida during 1892 were as follows: Hard rock to domestic ports 11,520 long tons, to foreign ports 168,843, making a total of 180,363 long tons. Shipments of pebble phosphates were to domestic ports 63,336 tons, to foreign ports 44,122, making a total of 107,458 long tons.

Comparative yearly shipments of Florida phosphates from January 1st, 1889, to December 31st, 1892: 1889, 7,600 tons; 1890, 56,600; 1891, 180,400 tons; 1892, 287,821 tons. The shipments during January, 1893, were 6,493 tons as compared with 5,367 tons for the same month of 1892.

Mr. Paul C. Trenholm, the well known broker of Charleston, S. C., writes us as follows: "The shipments of fertilizers have been quite large so far this season, being 108,679 tons from September 1st, 1892, to January 31st, 1893, against 67,035 for the same period of the previous season. Shipments are being kept up quite lively.

The shipments of phosphate rock from Charleston, S. C., during the month of January, 1892, were as follows: Crude, 9,116; ground, 713 tons.

The price of double manure salts as fixed by the syndicate is as follows: New York and Boston, $1.12; Philadelphia, $1.14½; Charleston and Savannah, $1.17 cwt. basis, 48@50% in 50 ton lots on foreign weights and analyses. Sulphate of potash, 90%-96%, basis, 90%: New York and Boston, $2.07; Philadelphia, $2.09½; Charleston and Savannah, $2.12; sulphate of potash, 96-99%, basis 90%, is 4% higher.

Muriate of Potash.—During the week, arrivals of muriate aggregated 100 tons. Two steamers are overdue, and in consequence there are no goods on the spot to speak of. Sales of 75 tons in a jobbing way at regular prices are reported. Holders are asking a small advance at the moment for stocks on the spot. Prices for 1893 are as follows: New York or Boston $1.78; Philadelphia, $1.80½; Southern ports, $1.83.

Kainit.—This market is very quiet. There were no arrivals during the week. The prices for September, October, November, December shipments have been advanced by 25c. Quotations for shipments previous to September are as follows: New York, Philadelphia and Boston, $8.75 for foreign invoice weight and test, and $9 for actual weight; Charleston, Savannah and Wilmington, $9.50 for invoice weight and test, and $9.75 for actual weight.

Nitrate of Soda.—There is not much activity in this market. Prices are lower, and we quote this week: On the spot, $2.25@$2.30. To arrive, $1.70@ $2.15, according to position.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified.

Acid—Acetic, chem. pure.....16@.17
Commercial, in bbls. and cbys...015@.017
Carbonic, liquefied, ℔ lb..... ....18@.25
Chromic, chem. pure, ℔ lb 1.00
for batteries.....40
Hydrobromic, dilute, U. S. P..... .25
Hydrocyanic, U. S. P.....45
Hydrofluoric.....20
Alcohol—95%, ℔ gall.....$2.30@$2.40
Absolute.....$3.80
Ammoniated.....$2.80
Alum—Lump, ℔ cwt..... $1.75@$1.80
Ground, ℔ cwt..... .....$1.85@$1.90
Powdered, ℔ lb..... .....04½@.05
Lump ℔ ton, Liverpool..... £5
Aluminum Chloride—Pure, ℔ lb.$1.25
Amalgamating solution, ℔ lb..... .60
Sulphate, ℔ cwt ..... $1.90@$2.50
Ammonia—Sul., in bbl. lots, ℔ lb.02½@.03
Carbonate, ℔ lb., English and German, .07½@.07¾
Muriate, white, in bbls., ℔ lb..... .08½
Aqua Ammonia—(in cbys)18°℔lb.03@.04
20°, ℔ lb.....04@.05
26°, ℔ lb..... 05@.05½
Antimony—Oxymur, ℔ lb..... .04@.06
Regulus, ℔ lb.....10@.11½
Argols—Red, powdered, ℔ lb..... .15
Arsenic—White, powdered ℔ lb..03@.03½
Red ℔ lb.....065@.07
Yellow.....08@.09
White at Plymouth, ℔ ton.....£12 2 6
Asbestos—Canadian, ℔ ton.....$50@$300
Italian, ℔ ton, c. i. f. L'pool....£18@£60
Ashes—Pot, 1st sorts, ℔ lb.....4.75@5
Pearl ....06@.06¼
Asphaltum—
Prime Cuban, ℔ lb.....04@.05
Hard Cuban, ℔ ton..... ....$28.00@$30.00
Trinidad, refined, ℔ ton...$30.00@$35.00
Egyptian and Syrian, ℔ lb.....05@.07½
Californian, at mine, ℔ ton$12.00@$26.00
at San Francisco, ℔ ton.$15.00@$29.00
Barium—Carbonate, pure, ℔ lb..... .45
Carbonate, commercial, ℔ lb.... .05@.10
Chlorate, crystal, ℔ lb.....75
Chloride, commercial, ℔ lb..... .05@.10
pure, ℔ lb..... .16
Iodide, ℔ oz.....40
Nitrate, ℔ lb..... .06½@.07½
Sulph., Am. prime white, ℔ ton$17.50@$19
Sulph., foreign, floated, ℔ ton.....$21@$23
Sulph., off color, ℔ ton.....$11.50@$14.00
Carb., lump, f. o. b. L'pool, ℔ ton.....£6
No. 1, Casks, Runcorn, " " .. £4 10 0
No. 2, bags, Runcorn, " " .. £3 15 0
Bauxite—℔ ton..... ....$10.00
Bichromate of Potash—Scotch, ℔ lb..... .....11@.12
American, ℔ lb..... .....11@.12
Bichromate of Soda—℔ lb...09½@.10
Borax—Refined, ℔ lb., in car lots.08@.09
San Francisco.....08@.08½
Concentrated, in car lots..... .07¾@.08
Refined. Liverpool ℔ ton.... £2
Bromine—℔ lb..... .....15@0.2
Cadmium Minion—℔ lb..... $2.00
Cadmium Iodide—℔ lb..... $5.50
Chalk—℔ ton ....$1.40@$1.75
Precipitated, ℔ lb..... .....05@.06
China Clay—English, ℔ ton..$13@$18.00
Domestic, ℔ ton..... .....$9@$11
Chlorine Water—℔ lb..... .10
Chrome Yellow—℔ lb..... .....10@.25
Chrome Iron Ore—℔ ton, San Francisco..... .....$10.00
Chromalum—Pure, ℔ lb..... .40
Commercial, ℔ lb..... 12
Cobalt—Oxide, ℔ lb..... $1.90@$2.00
Copper—Sulph. English Wks. ton £20@£21
Vitriol (blue), ordinary, ℔ lb. 03¼@.0[illegible]
" " extra..... .04½
Nitrate, ℔ lb..... .40
Copperas—Common, ℔ 100 lbs..90@$1.00
Best, ℔ 100 lbs.....$1.35@$1.50
Liverpool, ℔ ton, in casks....£2@£2 10s.
Corundum—Powdered, ℔ lb.. .04½@.09
Flour, ℔ lb..... .03
Cryolite—Powdered, ℔ lb., bbl. lots. .07
Emery—Grain, ℔ lb. (℔ kg.).... .04½@.05
Flour, ℔ lb..... .02¼@.10
Epsom Salt—℔ lb..... 01@.01½
Feldspar—Ground, ℔ ton..$6.00@$10.00
Crude.....$2.00@$3 00
Fluorspar—Powdrd, No. 1, ℔ ton.$20@$30
Lump, at mine..... .....$6@$8
French Chalk—
Fuller's Earth—Lump, ℔ ton. $16@$20
Glauber's Salt—in bbls., ℔ lb...01@.01¼
Glass—Ground, ℔ lb..... 10
Gold—Chloride, pure, crystals, ℔ oz. $12.00
pure, 15 gr., c. v., ℔ doz. $5.40
liquid, 15 gr., g. s. v., ℔ doz..... $5.50
Chloride and sodium, ℔ oz $6.00
15 gr., c.v., ℔ doz. $2.88
Oxide, ℔ oz..... .....$27.25
Gypsum—Calcined, ℔ bbl... $1.25@$1.50
Land Plaster.....
Iodine—Resublimed.....$3.30@$3 35
Iridium—Oxide ℔ lb..... $80
Iron—Nitrate, 40°, ℔ lb .....01@.01½
47°, ℔ lb..... .02@.02½
Kaolin—*See China Clay.*
Kieserite—℔ ton..... $9@$10
Lead—Red, American, ℔ lb ...06¾@.07½
White, American, in oil, ℔ lb. .06½@.07½
White, English, ℔ lb., in oil.. .08½@.08¾
Acetate, or sugar of, white.... .06@.06½
Granulated.....
Nitrate..... .....09@.10
Lime Acetate—Am. Brown.....90@.95
" Gray..$1.75@$1.87½
Litharge—Powdered, ℔ lb.. .06¾@.07½
English flake, ℔ lb..... .09@.09½
Magnesite—Crude, ℔ ton of 1,015 kilos.....$14.75
Calcined, ℔ ton of 2,240 lbs.....$22.00
Brick, ℔ ton of 2,240 lbs.....$47.50
Manganese—Ore, per unit..... 23@.28
Oxide, ground, ℔ lb..... 02½@.06½
Mercuric Chloride—(*Corrosive Sublimate*) ℔ lb..... .62@.64
Powdered, ℔ lb..... .50
Marble Dust—℔ bbl..... $1.25
Metallic Paint—Brown ℔ ton. $20@$25
Red..... $20@$25
Mineral Wool—Ordinary slag... .01½
Ordinary rock..... .02½
Ground, ℔ ton.....
Mica—In sheets according to size.
1st quality, ℔ lb..... .25@$6.00
Naphtha—Black.....
Nitre Cake—℔ ton..... $10.00
Ochre—Rochelle, ℔ lb..... $1.10@$1.50
Washed Nat Oxf'rd, Lump, ℔ lb.06½@.06¾
Washed Nat Oxf'rd, Powder, ℔ lb.07@.07¼
Golden, ℔ lb..... .....03@.05
Domestic, ℔ ton.. ..... $12@$20
Oils, Mineral—
Cylinder, light filtered, ℔ gal... .14@.16
Dark filtered, ℔ gal.... .10@.13
Extra cold test, ℔ gal. .20@.24
Dark steam refined, ℔ gal.09@.12
Phosphorus—℔ lb..... .5(@.55
Precip., red, ℔ lb..... .82@.85
white, ℔ lb..... .85@.90
Platinic Chloride—℔ oz..... .... $7
Plumbago—Ceylon, ℔ lb..... .04@.06
American, ℔ lb..... .05@.07
Potassium—Cyanide, ℔ lb., C. P. .70
67%, ℔ lb..... .45
fused 40
Bromide, domestic, ℔ lb..... .25@.28
Chlorate, English, ℔ lb.... .....14@.15
Chlorate, powdered, English, ℔ lb.. .14½@.15½
Carbonate, ℔ lb., by casks, 82% .04½@.05
Caustic, ℔ lb., pure slick..... .06@.06½
Iodide, ℔ lb..... .....$2.58@$2.80
Nitrate, refined, ℔ lb..... .06@.08
Bichromate, ℔ lb..... .....10@.11½
Yellow Prussiate, ℔ lb..... .23
Red Prussiate, ℔ lb..... .42@.45
Pumice Stone—Select lumps, ℔ lb03½@.15
Original cks., ℔ lb.... .....01½@.02
Powdered, pure, ℔ lb..... .01½@.01¾
Pyrites—Non-cupreous, p. units. .12@.1[illegible]
Quartz—Ground, ℔ ton.... $6.00@$10.00
Rotten Stone, Powdered, ℔ lb..03¼@.03½
Lump, ℔ lb..... .....06@.07
Original cks, ℔ lb..... .04½@.05½
Rubbing stone, ℔ lb ..... .03½@.04
Sal Ammoniac—lump, in bbls., ℔ lb.80¼
Salt—Liverpool, ground, ℔ sack... 70
Domestic, fine, ℔ ton.....$7@$7.5[illegible]
Common, fine, ℔ ton.....$4.50@$[illegible]
Turk's Island, ℔ bush..... .25@.2[illegible]
Salt Cake—℔ ton.... .....$10.0 @$15.00
Saltpeter—Crude, ℔ lb..... .03¾@.04
Soapstone—Ground, ℔ ton..... $8@$
Block and slab according to size.
Sodium—Prussiate, ℔ lb.. ..... .22@.24
Phosphate, ℔ lb.... ..... .04@.05
Stannate, ℔ lb.... ..... .06@.12
Tungstate, ℔ lb.... ....
Hyposulphite, ℔ lb., in casks. .0235@.024[illegible]
Strontium—Nitrate, ℔ lb.. . . .08¾@.09
Sulphur—Roll, ℔ lb..... .02½
Flour, ℔ lb..... .02¾
Sylvinit, 27@35%, S.O.P., per unit.....40
Talc—Ground French, ℔ lb....01¼@.01¾
American No. 1, ℔ lb..... .01¼@.01¾
American No. 2..... .006
Terra Alba—French, ℔ lb..... .65@.80
English, ℔ lb..... .65@.80
American, No. 1, ℔ lb..... .60@.70
American, No. 2, ℔ lb..... .45@.56
Tin—Crystals, in kegs or bbls.... .14@.16
feathered or flossed. .20
Muriate, single..... .07@.05
Double or strong, 54° B..... .10@.15
Oxymur, or nitro..... .19
Vermilion—Imp. English, ℔ lb. .85@.90
Am. quicksilver, bulk.....57 @.6[illegible]
Am. quicksilver, bags..... .58 @ .6[illegible]
Chinese..... .85 @$1.00
Trieste..... .90 @ .95
American..... .11½@ .12
Zinc White—Am., Dry, ℔ lb.. .04½@ .05
Antwerp, Red Seal, ℔ lb..... .06¾@.07
Paris, Red Seal, ℔ lb..... .07¾@.08
Muriate solution..... .06
Sulphate crystals, in bbls., ℔ lb. .03¾

THE RARER METALS.

Aluminum—℔ lb..... .50@.6[illegible]
Arsenic—(Metallic), per lb..... .40
Barium—(Metallic), per gram.... $4.00
Bismuth—(Metallic), per lb..... $2.25
Cadmium—(Metallic), per lb..... $1.00
Calcium—(Metallic), per gram....$10.00
Cerium—(Metallic), per gram..... $7.50
Chromium—(Metallic), per gram. $1.00
Cobalt—(Metallic), per lb..... $6.00
Didymium—(Metallic), per gram. $9.00
Erbium—(Metallic), per gram..... $7.50
Gallium—(Metallic), per gram...$140.00
Glucinum—(Metallic), per gram..$12.00
Indium—(Metallic), per gram..... $9.00
Iridium—(Fused), per oz..... $12.00
Lanthanum—(Metallic), per gr...$10.00
Lithium—(Metallic), per gram....$10.00
Magnesium—(Powdered), per lb. $4.00
Manganese—(Metallic), per lb..... $1.10
Chem. pure, per oz.$10.00
Molybdenum—(Metallic), per gm .50
Niobium—(Metallic), ger gram... $5.00
Osmium—(Metallic), per oz.....$65.00
Palladium—(Metallic), per oz....$35.00
Platinum—(Plate), per oz..... $11.00
Potassium—(Metallic), per lb.....$28.00
Rhodium—(Metallic), per gram.. $5.00
Ruthenium—(Metallic), per gm.. $5.50
Rubidium—(Metallic), per gram. $2.00
Selenium—(Metallic), per oz..... $1.80
Sodium—(Metallic), per lb..... 50@.75
Strontium—(Metallic), per gm.... .60
Tantalium—(Metallic), per gram. $9.00
Telurium—(Metallic), per lb..... $5.00
Thallium—(Metallic), per gram.. .20
Titanium—(Metallic), per gram.. $2.20
Thorium—(Metallic), per gram...$17.00
Tungsten—(Metallic), per lb..... .80
Uranium—(Oxide), per lb.. ..... $5.00
Metallic, per gm..... .20
Vanadium—(Metallic), per gm....$22.00
Yttrium—(Metallic), per gram.... $9.00
Zirconium—(Metallic), per oz ....$[illegible].0

STOCK MARKET QUOTATIONS

Aspen, Colo. Feb. 18.

Name of Stock.	Bid.	Asked.
Argentum Juniata.....	$0.65	$0.66
Aspen Contact.....	1.00	1.10
Aspen Deep Mining	.10	.11
Best Friend.....	.10	.12
Bi-Metallic...	.12	.14
Bushwacker.....	.20	.23
Delia S.....	1.90	2.00
Gold Valley Placer.....	..	.15
Little Annie.....	.07	.10
Mollie Gibson.....	7.95	8.00
Pontiac.....	.10	.12
Smuggler.....	16 50	17.00
St. Joe & Mineral Farm ..	.11	.13
U. S. Paymaster.....	....	.20

Colorado Springs, Colo. Feb. 18.

	Bid.	Asked.
Anaconda Gold.....	.42	45
Calumet.....	.05½	.06
Cleopatra.....	.10	.20
Fanny Rawlins.....	.13	.16
Gold & Globe.....	....	.07½
Gold King.....	.26	....
Isabella	.16½	..
Jack Pot.....	.02	.02
Jeff Davis.....	.02	.04
Lemhi.....	1.25	..
Manitou Park	...	.10
Matoa.....	.07	.10
Ophir	10½	.12
Orphan Bell.....	.06½	.07
Pearce-Jensen Reduct'n Co.	.08	.10
Pharmacist.....	.27	.28
Summit M. & M.....	.25	.26
Work.....	08½	.09
World.....	.04	.05

Rico, Colo. Feb. 18.

Atlantic Cable Cons. M. Co.....	$0 25
Atlantic Cable guaranteed.....	.70
Enterprise Mining Co.....	3 50
Iron Dollar Silver Mines Co...	.25
Southern Cons. Treasury Stock,....	.25
Uncle Ned Co.....	.30

Denver.

Prices and sales for the week ending February 18th, 1893:

	High.	Low.	Sales.
Anaconda.....	$0.42½	$0 36	11,400
Amity.....	.01¾	.01½	4,000
Bangkok-Cora Belle	.02¼	02¼	2,200
Brownlow..... ...	.03	.02½	3,700
Clay Co.....	.01¾	.01½	5,500
Diamond B.....	.01½	.01½	2,600
Gettysburg.....	.06	.04	4,200
Gold Rock.....	.04¾	.04	2,600
Golden Treasure.....	.06½	.06½	500
Justice.....	.01½	.01½	2,000
Orphan Boy.....	.02½	.02½	500
Tam O'Shanter.....	.02½	.02½	500
Work.....	.09¼	.08½	23,100
Total sales.....			62,800

Helena, Mont.

(Special report by F. M. DAVIS.)

Prices highest and lowest for the week ending February 11th.

Stock.	H.	L.
Bald Butte (Mont.)	$2.50	$2.10
Benton Group (Neihart), Mont..	.25	.20
Combination (Phillipsb'g), Mont.	1.50	1 25
Cumberland (Castle), Mont....	.25	.15
Elizabeth (Phillipsb'g), Mont...	.45	.42½
Florence (Neihart).....	.22½	.17½
Helena & Victor, Mont.....	.60	.65
Iron Mountain (Missoula), Mont.	.82½	.75
Poorman (Cœur d'Alene), Idaho	.75	.60
Whitlach Union & MacIntyre.	.50	.40

Pittsburg, Pa. Feb. 15.

COMPANY.	B	A.
Bridgewater Gas Co.....	27.00	40.00
Chartiers Val. Gas	10.00	11.00
Enterprise Mining Co.....	....	3.00
Hidalgo Mining Co.....	5.50	6.50
Juster Mining Co.....	10.00	10.38
Manufacturers' Gas.....	....	30.000
N. Y. & Clev. G. D.....	50.00	51 50
Pennsylvania Gas	....	10.25
People's N. G. & P. Co.	14.63	....
Philadelphia Co	22.00	22.25
Tuna Oil.....	....	20.00
Wheeling Gas Co.....	20.50	21 75
W'house Air Brake Co.....138.50		140.00

Duluth. Feb. 17.

LISTED STOCKS.

	Par.	Bid.	Asked
Biwabik M. Iron Co.....100		35.50	37.00
Cincinnati Iron Co..... 25		1.75	1.90
Clark Iron Co..... 100		.20	....
Cosmopolitan Iron Co.....		.10	....
Great Northern Min. Co..100		8 50	9.50
Kanawha Iron Co..... 100		1.00	1.50
Keystone Iron Co		....	1.00
Lake Superior Iron Co.... 25		2 50	2.75
Lincoln Iron Co.....		.'0	....
Little Mesaba Iron Co....100		2.00	3.50
Mountain Iron Co 100		85 00	95.00
Minneapolis Iron Co.....100		.10	....
Mesaba Moun. Iron Co. ..100		24.75	25.25
Shaw Iron Co... 100		7.20	7.40
Security Land & Exp. Co. 10		25.00	30.00
Washington Iron Co.....100		....	1.00

UNLISTED STOCKS.

Allegheny Iron Co..... 10		....	.05
Aurora Iron Co..... ..		....	.75
Buckeye Iron Co.....100		....	2.50
Chicago Iron Co..... 100		1.00	2.00
Charleston Iron Co.....100		2.85	2.95
Champion Iron Co..... 100		.50	.75
Comstock Iron Co.....100		.10	....
Columbia Iron Co.....100		..	2.75
Detroit Iron Co..... 25		.40	.50
Dayton Iron Co.....100		.10	.30
Great Western Mining Co.100		....	4.00
Horton Mining Co..... 10		.05	.15
Homestead Iron Co..... 25		.04¼	.06
Imp. Iron Mt. Mining Co. ..		....	.50
Kentucky Iron Co.....100		.10	.40
Kakina Iron Co 25		....	2.00
Lackawanna Iron Co....100		.60	.70
McCaskill Mining Co..... ..		.05	.10
McKinley Iron Co 100		..	28.50
Mesaba Chief Iron Co....100		5.55	....
Mesaba Iron Co..... ..		....	.85
Myrna Iron Co..... 10		....	.25
Northern Light Iron Co ..100		.10	.20
New York Iron Co..... 25		....	....
New England Iron Co... 100		....	2.50
Ohio Mining Co.....100		10.00	11.00
Oneota Iron Co 100		.10	.35
Pennsylvania I. & S. Co..100		.25	.35
Rouchleau Iron Co 100		.85	1.00
Republic Iron Co..... 25		.60	.75
Red Hematite Iron Co....100		....	35
Standard Ore Co 25		1.00	2.50
Towanda Iron Co.....100		1.25	2.00
Zenith Iron Co.... 25		1.75	3.00

NEW YORK MINING STOCK QUOTATIONS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Feb. 18		Feb. 20.		Feb. 21.		Feb. 22.		Feb. 23.		Feb. 24.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Adams, Colo.													
Alice, Mont.													
Amador, Cal.													
Atlantic, Mich.													
Belcher, Nev.													
Belle Isle, Nev.													
Bodie Cons., Cal.													
Bos. & Mont., Mont													
Breece, Colo.													
Bulwer, Cal.													
Caledonia, S. Dak.	1 15												100
Catalpa, Colo.													
Chrysolite, Colo.	.22												500
Colorado Central, Colo.													
Commonwealth, Nev.													
Comstock T. bonds, Nev.	.15				.14				.17				9,000
" scrip, Nev.													
Cons. Cal. & Va., Nev.	2 65	2.55	2.60	2.55	2.90						3 00		80
Crown Point, Nev.											.55		200
Deadwood, Dak.													
Enterprise													
Eureka, Cons., Nev.													
Father de Smet, Dak.													
Freeland, Colo.													
Gould & Curry, Nev.													
Grand Prize, Nev.													
Hale & Norcross, Nev.													
Homestake, Dak.													
Horn-Silver, Utah.													
Independence, Nev.													
Iron Hill, Dak.													
Iron Silver, Colo.													
Leadville Cons., Colo.	.20		.19						.19				1,100
Little Chief, Colo.													
Martin White, Nev.													
Mono.													
Mt. Diablo, Nev.													
Navajo, Nev.													
N. Belle Isle, Nev.													
Ontario, Utah.			15.00		15 00				15.00				135
Ophir, Nev.	2 15	2.10			2.40				3.25				400
Overman, Nev.													
Plymouth, Cal.													
Quicksilver, Pref., Cal.													
" Com., Cal.													
Quincy, Mich.													
Robinson Cons., Colo.	.39												100
Savage, Nev.													
Sierra Nevada, Nev.	1.40	1.35											200
Silver Cord, Colo.													
Silver King, Ariz.													
Silver Min. of L. Valley.													
Small Hopes, Colo.													
Standard Cons., Cal.													
Yellow Jacket, Nev.											60		100

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Feb. 18		Feb. 20.		Feb. 21.		Feb. 22.		Feb 23.		Feb. 24.		SALES
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alpha., Nev.													
Alta, Nev.													
American Flag, Colo.													
Andes, Cal.													
Astoria, Cal.													
Augusta, Ga.													
" bonds.													
Barcelona, Nev.													
Belmont, Cal.	.21	.20	20		.22						.22		90
Best & Belcher, Nev.	1.75										1.85		200
Bonanza King, Cal.													
Brunswick, Cal.			.09		09								600
Bullion, Nev.	.75	.70			.95								400
Butte & Bost., Mont.													
Castle Creek, Idaho.													
Choilar													
Comstock T., Nev.	.10				11	10			.13	.12	.13	12	17,500
Con. Imperial, Nev.													
Con. Pacific, Cal.													
Crescent, Colo.													
Del Monte, Nev.													
El Cristo. Rep. of Col.	.50												300
Emmett, Colo													
Exchequer, Nev.	.25	20											500
Independence, Nev.													
Julia, Nev.	12	.10			12	.11			.13	11	12		1,600
Justice, Nev													
Kentuck, Nev													
Lacrosse, Colo.													
Lee Basin, Colo.													
Mexican, Nev.	1 85		1 80								1 90		3.0
Middle Bar, Cal.													
Monitor, Colo.													
Monte Cristo, N. S. of C	3.15	3.10	3 16	3.15	3.20	3.20			3.25		3.25		3,800
Nevada Queen, Nev.													
N. Standard, Cal.													
N. Commonwealth, Nev.													
Occidental, Nev.													
Oriental & Miller, Nev.													
Phœnix Lead, Colo.													
Phœnix of Ariz.					20	15					.15		2,700
Potosi, Nev.													
Rappahannock, Va.													
S. Sebastian, S. Sal.													
Santiago	02												100
Scorpion, Nev.													
Seg. Belcher, Nev.													
Shoshone, Idaho.													
Silver Hill, Nev.													
Sullivan Con., Dak.													
Sutro Tunnel, Nev.													
Syndicate, Cal.	10												300
Tornado Con., Nev.													
Union Cons., Nev.													
Utah, Nev.													

*Ex-dividend. †Dealt at in New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 12,635 Non-dividend shares sold, 29,400. Total shares sold, 24,035.

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY.	Feb. 17.		Feb. 18		Feb. 20		Feb. 21.		*Feb. 22.		Feb. 23.		SALES.
Atlantic, Mich.			10.25				9.00						52
Bodie, Cal.													
Bonanza Development.													
Bost. & Mont., Mont.	34.25	34 00	34.25	34.00	34.00	33.00	33.25						1,305
Breece, Colo.													
Calumet & Hecla, Mich.	310				310		310				3.5		18
Catalpa, Colo.													
Central, Mich.													
Cœur d'Alene, Id.													
Con. Cal. & Va., Nev.													
Dunkin, Colo.													
Eureka, Nev.													
Franklin, Mich.					18.00	12 88	13 25				13.00	12.75	520
Honorine, Utah.													
Horn Silver, Utah.													
Kearsarge, Mich.	11 75	11.63	12 00		11.50	11.00							460
Lake Superior, Iron.													
Little Pittsburg, Colo.													
Minnesota Iron, Minn.													
Napa, Cal.													
Ontario, Utah.													
Osceola, Mich.	37 38	37.00			36 38	36.25					36 50	36.50	510
Quincy, Mich.	137	136									137	136	48
Ridge, Mich.													
Sierra Nevada, Nev.													
Silver King, Ariz.													
Stormont, Utah.													
Tamarack, Mich.	162		162		161						162		85
Tecumseh, Mich.													

NAME OF COMPANY.	Feb 17.		Feb. 18.		Feb 20.		Feb. 21.		Feb. 22.		Feb. 23.		SALES.
Allouez, Mich.	.75												100
Arnold, Mich.													
Aztec, Mich.													
Brunswick, Cal.													
Butte & Boston, Mont.	11 00				10 88	10 25	10 75				10 88	10.25	815
Centennial, Mich.	8 50	8 00	9.00	8 25	8.25	8.13	8 25	8 00					545
Colchis, N. Mex.													
Copper Falls, Mich.													
Crescent, Colo.													
Dana, Mich.													
Don Enrique, Mex.													
Geyser, Colo.													
Hanover, Mich.													
Humboldt, Mich.													
Hungarian, Mich.													
Huron, Mich.													
Mesnard, Mich.													
National, Mich.													
Native, Mich.													
Oriental & M., Nev.													
Phœnix, Ariz.													
Pontiac, Mich.													
Rappahannock, Va.													
Santa Fe, N. Mex.													
Shoshone, Idaho.													
South Side, Mich.													
Tamarack, Jr., Mich.	20.00				20 00								45
Washington, Mich.													
Wolverine, Mich.											2.50		15

*Holiday. Dividend shares sold, 2,998. Non-dividend shares sold, 1,520. Total shares sold, 4,518

DIVIDEND-PAYING MINES.

	Name and Location of Company.	Capital Stock.	Shares. No.	Par	Assessments. Total levied.	Date and amount of last			Dividends. Total paid.	Date & amount of last.		
1	Adams, s. L. C.	Colo.	$1,500,000	150,000	$10	*				$637.500	Jan.,	1892 .05
2	Alaska-Treadwell, g.	Al'ska	5,000,000	200,000	25					1,450,000	Oct.	1892 .37½
3	Alice, s.	Mont.	10,000,000	400,000	25	*				975,000	Nov.,	1891 .06¼
4	Alma & Nel Wood., g	Idaho	300,000	30,000	10	*				60,000	Jan:	1889 .50
5	Amador, G.	Cal.	1,250,000	250,000	5	*				31,250	Aug..	1890 .12½
6	American, G.	Colo..	3,000,000	300,000	10	*				225,000	Mar..	1892 .05
7	American Belle, s. G. C	Colo.	2,000,000	400,000	5	*				50,000	April	1891 .12½
8	Americ'n & Nettie, G. S	Colo.		300,000						175,000	Mar..	1892 .05
9	Atlantic, C.	Mich..	1,000,000	40,000	25	280,000	April	1875	$1.00	700,000	Feb..	1891 1.00
10	Argenta, s.	Nev..	10,000,000	100,000	100	335,000	July.	1889	.10	40,000	Feb..	1880 .20
11	Argyle, G.	Colo..	1,000,000	1,000,000	1	*				20,000	Mar.	1892 .01
12	Aspen Mg. & S., S. L.	Colo..	2,000,000	200,000	10	*				76,000	Sept.	1892 .10
13	Aurora, I.	Mich..	2,500,000	100,000	25					455,000	June	1892 1.00
14	Badger, S	Ont..	250,000	50,000	5	*				37,500	Mar.	1890 .25
15	Bald Butte	Mont	250,000	250,000	1	*				72,500	Mar..	1892 .03
16	Bates Hunter, s. g.	Colo..	1,000,000	1,000,000	1						Dec..	1891 .00¾
17	Belle Isle, S.	Nev..	10,000,000	100,000	100	220 00	Aug.	1892	.10	300,000	Dec..	1879 .25
18	Belcher, S. G.	Nev..	10,400,000	104,000	100	3,16 00	May	1892	.25	15,397,000	April	1876 1.00
19	Bellevue, Idaho, S. L.	Idaho	1,250,000	125,000	10	1. 00	Dec..	1889	.2	200,000	Jan..	1890 .10
20	Best Friend.	Colo.	1,000,000	1,000,000	1					90,000	Feb..	1892 .01
21	Bi-Metallic, S. G.	Mont.	5,000,000	200,000	25					2,140,000	Dec.	1892 .20
22	Bodie Con., G. I.	Cal..	10,000,000	100,000	100	0,000	June	1890	.25	1,602,572	April	1885 .50
23	Boston & Mont., G.	Mont.	2,500,000	250,000	10	*				520,000	June	1886 .15
24	Boston & Mont., C. S.	Mont.	3,125,000	125,000	25	*				2,075,000	Nov..	1891 1.00
25	Brooklyn Lead, L. S.	Utah.	500,000	50,000	10					127,000	July.	1887 .05
26	Bulwer, G.	Cal..	10,000,000	100,000	10	30,000	Aug..	1889	.25	191,000	Oct..	1892 .05
27	Bunker Hill & S. S. L.	Idaho	3,000,000	300,000	10	*				150,000	Oct..	1888 .06⅔
28	Caledonia, G.	Dak..	10,000,000	100,000	100	505,000	May.	1885	.15	192,000	Oct..	1890 .08
29	Calliope, S.	Colo..	1,000,000	1,000,000						140,000	Jan..	1891 .00¾
30	Calumet & Hecla C	Mich..	2,500,000	100,000	25	1,200,000				38,800,000	Dec.	1892 5 00
31	Centen'l-Eureka, S. L.	Mich..	1,500,000	30,000	50					577,500	Dec.	1892 .50
32	Central, C.	Mich..	500,000	20,000	25	100,000	Oct..	1861	.65	1,970,200	Feb..	1891 1.00
33	Champion, G	C		34,000	10					114,900	Dec	1892 .10
34	Chrysolite, S. L.	Colo..	10,000,000	200,000	50	*				1,650,000	Dec..	1884 .25
35	Clay County, G.	Colo..	200,000	200,000	1	*				56,000	Nov..	1891 .02
36	Clinton Con, g	Cal..	5,000,000	100,000	5					90,000	Nov..	1891 .10
37	Cœur D'Alene, S. L.	Idaho	5,000,000	500,000	10					810,000	Nov..	1891 .02
38	Colorado Central, S. L.	Colo..	2,750,000	275,000	10	*				502,500	Jan..	1892 .05
39	Commonwealth, S.	Nev..	10,000,000	100,000	100	190,000	Sept.	1892	.10	20,000	Nov..	1890 .20
40	Confidence, S. L.	Nev..	2,496,000	24,960	100	1,589,650	Aug.	1892	.50	199,680	April	1889 1.00
41	Cons. Cal. & Va., S. G	Nev..	21,600,000	216,000	100	105,000	Jan..	1885	.20	3,682,800	Aug.	1891 .50
42	Contention, S.	Ariz.	12,500,000	250,000	50					2,637,500	Aug.	1892 .20
43	Cook's Peak, S.	N. M.	2,000,000	200,000	10					114,532	Nov.	1892 .05
44	Cop. Queen Con., C.	Ariz..	1,400,000	140,000	10					1,26,000	Nov.	1892 1 00
4	Coptis	Nev.	10,000,000	100,000	100					67,000	July..	1892 .12
46	Cortez, S.	Nev..	1,500,000	300,000	05	*				687,000	Mar..	1892 .50
47	Cresoent, S. L. G.	Utah.	15,000,000	600,000	25	60,000	Oct	1892	.10	238,000	Oct..	1888 .03
48	Crown Point, G. S.	Nev..	10,000,000	100,000	100	2,700,000	Sept.	1892	.25	11,898,000	Jan..	1875 2.00
49	Cumberland, L. S.	Mont.	5,000,000	500,000	10	*				15,000	Nov.	1889 .03
50	Daly, S. L.	Utah.	3,000,000	150,000	20					2,650,000	Jan.	1893 .25
51	Deer Creek, S. G.	Idaho	1,000,000	200,000	5	*				20,000	June	1889 .06
52	Deadwood-Terra, G.	Dak..	5,000,000	200,000	25	*				1,150,000	Oct..	1892 .05
53	DeLamar, S. G.	Idaho	2,000,000	400,000	5					550,000	Oct..	1892 .25
4	Derbec B. Grav., G.	Cal..	10,000,000	100,000	100	100,000	Sept.	1892	.10	60,000	Aug..	1891 .10

NON-DIVIDEND-PAYING MINES.

	Name and Location of Company.	Capital Stock.	Shares. No.	Par	Assessments. Total levied.	Date and am't of last.			
1	Alliance, S. G.	Utah.	$100,000	100,000	$1	$120,000	Feb..	1891	.2
2	Allouez, C.	Mich.	2,000,000	80,000	25	737,000	Jan..	1890	.7
3	Alpha Con., G. S.	Nev..	3,000,000	30,000	100	209,000	Sept.	1892	.1
4	Alta, S.	Nev..	1,080,000	100,800	100	3,369,880	Jan.	1892	.1
5	American, C.	Idaho	5,000,000	500,000	10				
6	American Flag, S.	Colo..	1,250,000	125,000	1	300,000	June	1887	
7	Amity, S.	Colo..	250,000	250,000	20				
8	Anchor S. L. G.	Utah	3,000,000	150,000	5	410,000	June	1890	.20
9	Anglo-Montana, Lt.	Mont.	600,000	120,000	125				
10	Appalachian, g.	N. C	1,750,000	1,400,000	20				
11	Arizona, C.	Ariz	3,575,000	160,000	2				
12	Astoria, G.	Cal..	200,000	100,000	5				
13	Atlanta, G. S.	Idaho	3,250,000	650,000	25				
14	Barcelona, G.	Nev..	5,000,000	200,000	5	*			
15	Bear Creek	Idaho	100,000	20,000	1				
16	Belmont, G.	Cal..	500,000	500,000	100	*			
17	Belmont, S.	Nev..	5,000,000	50,000	100	735,000	April	1886	.10
18	Best & Belcher, S. G.	Nev..	10,080,000	100,800	10	2,405,278	Aug..	1892	.35
19	Black Oak, G.	Cal..	3,000,000	300,000	100	*			
20	Boston Con., G.	Cal..	10,000,000	100,000	1	170,000	Nov.	1888	.25
21	Brownlow, G.	Colo..	250,000	250,000	5				
22	Brunswick, G.	Cal.	2,000,000	400,000	2				
23	Buckeye, S. L.	Mont.	1,000,000	500,000	100				
24	Bullion, S. G.	Nev.	10,000,000	100,000	100	2,890,000	Aug	1892	.25
25	Burlington, G. S.	Cal..	10,000,000	100,000					
26	Butte & Boston, C. S.	Mont.	5,000,000	200,000	10				
27	Butte Queen, G.	Cal..	1,000,000	100,000	1	6,000	Jan..	1892	.04
28	Calaveras, G.	Cal..	500,000	500,000	5				
29	Calaveras Con., g.	Cal..	800,000	160,000	10				
30	California, G.	Cal..	1,000,000	100,000	5	9,000	Mar.	1892	.03
31	California Con. L. Q.	Cal..	2,250,000	450,000	10				
32	Camille, g	Ga	1,500,000	150,000	5				
33	Carisa, G.	Wy..	500,000	100,000	2	*			
34	Carupano, G. S. L. C.	Ven..	200,000	100,000	2	*			
35	Cashier, G. S.	Colo..	500,000	250,000	100	*			
36	Challenge Con., g. S.	Nev..	5,000,000	50,000	10				
37	Cherokee, G.	Cal..	1,500,000	150,000	100				
38	Chollar, S. G.	Nev..	11,200,000	112,000	2	1,820,000	May	1892	.50
39	Cleveland, T.	Dak..	1,000,000	500,000	10	*			
40	Colchis, S. G.	N. M..	500,000	150,000	5				
41	Colorado, S.	Colo..	1,625,000	325,000	1				
42	Comstock, S.	Utah.	1,250,000	250,000	100				
43	Comstock Tun.	Nev..	10,000,000	100,000	100	35,000	Mar	1887	.15
44	Con. Imperial, G. S.	Nev..	5,000,000	50,000	50	2,062,500	Jan.	1892	.25
45	Con. New York, S. G.	Nev..	5,000,000	100,000	100	110,000	Mar..	1892	.10
46	Con. Pacific, G.	Cal..	6,000,000	60,000	10	198,000	June	1890	.10
47	Con. Silver, S.	Mo..	2,500,000	250,000	5				
48	Cordova Union, G.	Cal..	1,000,000	200,000	10				
49	Crescent, S. L.	Colo..	3,000,000	300,000	100	*			
50	Crocker, S.	Ariz..	10,000,000	100,000	1	165,000	Aug.	1892	.05
51	Crowell, G.	N. C..	500,000	500,000	1				
52	Dahlonega, G.	Ga..	250,000	250,000	10	*			
53	Dandy, S.	Colo..	5,000,000	500,000					
54	Decatur, S	Colo..	1,500,000	300,000					

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares		Assessments.				Dividends.			
				No.	Par	Total Levied.	Date and amount of last			Total paid.	Date & amount of last		
55	Dexter, g. s	Nev..	1,000,000	100,000	10					80,000	Aug..	1892	.25
56	Dunkin, s. L	Colo..	5,000,000	200 00	25	*				390,000	Oct..	1889	.05
57	Elkhorn, s. L	Mont.	1,000,000	200 00	5	*				885,545	Dec	1892	.50
58	Enterprise, s.	Colo..	2,500,000	5 0,000	5	*				750,000	Feb.	1893	.05
59	Eureka Con., s. L., G.	Nev...	1,000,000	50,000	100	550,000	June	1889	.50	5,017,500	Jan	1892	.25
5?	Evening Star, s. L	Colo..	500,000	50,000	10	*				1,450,000	Dec.	1889	.2
61	Father de Smet, G	Dak..	10,000,000	100,000	100	200,000	Nov..	1878	1.00	4,125,000	Dec..	1885	.20
62	Franklin, C.	Mich..	1,000,000	40,000	25	220,000	June	1871		1,106,00	July	1892	2.00
63	Freeland, s. G	Colo..	5,000,000	200,000	25	*				190,000	July.	1886	.10
64	Garfield Lt., G. S.	Nev ..	500,000	100,000	5					90.000	April	1888	.12½
65	Glengarry	Mont.	1,000,000	100,000	10					10,000	June	1891	.10
66	Gold Rock	Colo..	500,000	500,000	1						Dec..	1891	.01
67	Golden Reward	S.Dak	1,250,000	250,000	5					65,000	Dec.	1892	.02
68	Gould & Curry, s. G	Nev...	10,800,000	108,000	100	4,591,200	June	1892	.25	3,826,800	Oct..	1870	10.00
69	Grand Prize, s	Nev..	10,000,000	100,000	100	785,000	Jan..	1890	.30	495,000	Mar.	1884	.25
70	Granite, s. L	Idaho	500,000	500,000	1	*				83,400	Nov..	1890	.02
71	Granite Mountain, s.	Mont.	10,000,000	400,000	25					12,120,000	July.	1892	.20
72	Great Western, L. Q	Cal...	5,000,000	50,000	100					394,861	Dec.	1892	.25
73	Green Mountain, G	Cal..	1,250,000	125,000	10					212,000	Nov..	1891	.07½
74	Hale & Norcross, G. S.	Nev...	11,200,000	112,000	100	5,534,800	Aug.	1892	.50	1,822,000	Aug.	1888	.50
75	Hecla Con., s. G. L. C.	Mont.	1,500,000	30,000	50					1,920,000	Dec	1892	.50
76	Hel'a Mg.& Red.,s.L.G.	Mont.	3,315,000	663,000	5	*				197,970	July.	1886	.06
77	Helena & Frisco, s.L.	Idaho	2,500,000	500,000	5					170,000	July..	891	.02
78	Helena & Victor	Mont.	1,000,000	200,000	5					80,000	May..	1891	.05
79	Hoomes, s	Nev..	10,000,000	100,000	100	370,000	May.	1890	.25	75,000	April	1886	.25
80	Homestake, G	Dak..	12,500,000	125,000	100	200,000	July.	1878	1.00	4,941,250	Jan..	1893	.25
81	Honorine, s. L	Utah.	500,000	250,000	2	37,500	April	1889	.05	125,000	Sept.	1887	.05
82	Hope, s	Mont.	1,000,000	100,000	10	*				3 8,252	Jan .	1893	.25
83	Horn-Silver, s. L	Utah	10,000,000	400,000	25	*				4,659,000	Dec.	1892	.12½
84	Hubert, G	Colo..	1,000,000	1,000,000	1	*				247,000	Dec..	1889	.00½
85	Idaho, G	Cal..	310,000	3,100	100					5,413,25	Dec.	1892	2.50
86	Illinois, s	N. M..	100,000	100,000	1	*				45,000	April	1889	.20
87	Iron Hill, s	Dak..	2,500,000	250,000	10	134,000	July.	1889	.03	156,250	Nov..	1887	.07½
88	Iron Mountain, s	Mont.	10,000,000	500,000	10	*				215,000	Aug..	1892	.03
89	Iron-Silver, s. L	Colo..	10,000,000	500,000	20	*				2,500,000	April	1889	.20
90	Jack Rabbit, G	Cal.	10,000,000	100,000	100	100,000	Sept.	1892	.10	260,000	Aug	1891	.10
91	Jackson, G. S.	Nev..	5,000,000	50,000	100	237,500	Nov.	1880	.20	60,000	Jan.	1891	.10
92	Kearsarge, C	Mich..	1,000,000	40,000	25	190.000	Oct..	1887	1.00	80,000	Jan.	1890	2.00
93	Kennedy	Cal..	10,000,000	100,000	100					387,000	May..	892	.15
94	Kentuck, s. G	Nev..	3,000,000	30,000	100	454.180	Oct..	1891	.15	1,350,000	Dec.	1886	.10
95	La Plata, s. L	Colo..	2,000,000	200,000	10	*				610,000	Sept.	1882	.30
96	Leadville Con., s. L	Colo..	4,000,000	400,000	10	*				304,000	May..	1892	.03
97	Lexington, G. S.	Mont.	4,000,000	40,000	100	*				609,000	Jan..	1890	2.00
98	Little Chief, s. L	Colo..	10,000,000	200,000	50	*				820,000	Dec..	1890	.05
99	Little Rule, s	Colo..		500,000	1					220,000	Dec..	1891	.02
100	Maid of Erin	Colo..	3,000,000	600,000	5					557,757	April	1892	.25
101	Mammoth, s. L. C	Utah	10,000,000	400,000	250	110,000		1882	.25	1,040,000	Dec..	1891	.10
102	Martin White, s	Nev.	10,000,000	100,000	100	1,275,000	Jan..	1892	.25	140,000	Dec..	1886	.25
103	Mary Murphy, s. G	Colo..	350,000	3,500	101	*				175,000	May..	1888	5.00
104	Matchless, s. L	Colo..	500,000	500,000	1	*				15.000	Feb..	1890	.00½
105	Maxfield	Utah.	3,000,000	300,000	10					117,000	April	1892	.03
106	Mayflower, D. gravel	Cal	1,000,000	100,000	10					100,000	Dec.	1892	.25
107	May Mazeppa, s. L	Colo..	1,000,000	100,000	1					205,000	Oct..	1891	.03¾
108	Minas Prietas, G. S.	Mex..	1,000,000	100,000	10	*				350,000	Dec..	1890	.50
109	Minnesota, C	Mich..	1,000,000	40,000	25	420,000	April	1886	1.00	1,820,000	Mar	1876	
110	Mollie Gibson, S	Colo..	5,000,000	1,000,000	5					2,850,000	Jan	1892	15
111	Monitor, G	S.Dak	2,500,000	250,000	10					45,000	Oct.	1890	.03
112	Mono, G	Cal...	5,000,000	50,000	100	760,000	Sept.	1890	.25	12.500	Mar	1886	.25
113	Montana, Lt., G. S	Mont.	3,300,000	660,000	5	*				2,619,075	June.	1891	12½
114	Morning Star, s. L	Colo..	1,000,000	100,000	10					925,000	April	1891	.25
115	Morning Star Drift, G	Cal.	240,000	2,400	100					111,800	Dec..	1892	3.00
116	Mouiton, s. G	Mont.	2,000,000	400,000	5	*				410,000	Nov.	1892	07½
117	Mt. Diablo, s	Nev..	5,000,000	50,000	100	137,500	June	1880	2.00	210,000	July.	1891	.20
118	Napa, Q	Cal...	700,000	100,000	7					520,000	Jan.	1893	.20
119	Navajo, G. S	Nev.	10,000,000	100,000	100	520,000	May.	1891	20	229,950	April	1889	.10
120	Newton	Cal ..	10,000,000	100,000	100					10,000	May..	1891	.05
121	New California, G	Colo..	800,000	160,000	5	*				48,800	May..	1890	12½
122	New Guston, s	Colo..	550,000	110,000	5					1,877,500	April	1892	.75
123	North Banner Con	Cal ..	1,000,000	100,000	10					20,000	July..	1891	.05
124	North Commonw'th	Nev..	10,000,000	100,000	10					25,000	June.	1891	.25
125	N. Hoover Hill, G. S.	N. C	300,000	120,000	2½	*				30,000	Dec..	1885	.06½
126	North Belle Isle, s	Nev..	10,000,000	100,000	100	474,689	Nov.	1892	.10	230,000	May	1888	.50
127	North Star, G	Cal..	1,000,000	100,000	10					350,000	Dec.	1892	.50
128	Omaha Cons., G	Cal...	2,400,000	24,000	100					30,000	May..	1892	.15
129	Ontario, s. L	Utah	15,000,000	150,000	100					13,175,000	Oct..	1892	.50
130	Ophir, G. S	Nev..	10,000,000	100,000	100	4,210,640	April	1890	.50	1,595,800	Jan..	1880	1.00
131	Original, s. C	Mont.	1,500,000	60,000	25	*				138,000	Jan..	1889	.05
132	Oro, s. L. G	Colo..	500,000	100,000	5					95.000	July.	1890	.20
133	Osceola, C	Mich..	1,250,000	50,000	25	480,000	April	1876	1.60	1,697,500	Dec.	1892	1.00
134	Pacific Coast, B	Cal...	1,500,000	15,000	100					36.,000	Dec.	1892	1.00
135	Parrot, C	Mont.	1,800,000	180,000	10					1,405,38	Dec.	1892	.10
136	Petro	Utah.	10,000,000	10,000	100					17,500	July.	1891	.75
137	Plumas Eureka, G	Cal...	1,406,250	140,625	10					2,645,559	April	1892	.18
138	Plymouth Con , G	Cal...	5,000,000	100,000	50	*				2,280,000	Feb.	1888	.40
139	Poorman, G. S	Idaho	375,000	3 0,000	125	*				68,260	Sept	1892	
140	Quicksilver, pref., Q	Cal...	4,300,000	43,000	100					1,825,911	June	1891	1.25
141	" com., Q	Cal...	5,700,000	57,000	100					643 867	July.	1892	.40
142	Quincy, C	Mich..	1,250,000	50,000	25	200,000	Dec..	1862		6,470,000	Feb	1893	3.00
143	Red Cloud	Idaho	1,000,000	200,000	5					153,100	Dec.	1892	.10
144	Reed National, s. G	Colo..	500,000	500,000	1	*				50,000	Dec..	1891	.01
145	Retriever, L	S.Dak	1,250,000	250,000	5					20,000	Aug..	1891	.03
146	Rialto, G. L	Colo.	300,000	300,000	1					50,250	April	1892	.01½
147	Richmond, s. L	Nev.	1,350,000	54,000	25	*				4,346,32	Aug..	1891	.25
148	Ridge, C	Mich..	500,000	20,000	25	219,939	Mar.	1886		99,785	Feb..	1886	.50
149	Robinson Con., s. L	Colo..	10,000,000	200,000	50	*				585,000	Mar	1886	.05
150	Running Lode, G	Colo..	1,000,000	1,000,000	1	*				36,000	May	1892	00 1-10
151	Savage, s	Nev..	11,200,000	112,000	100	6,772,000	Feb..	1892	.50	4,460,000	June	1869	3.00
152	Sheridan, s. G	Colo..	300,000	3,000	100	*				300,000	Oct..	1891	2.50
153	Shoshone, G	Idaho	150,000	150,000						7,500	April	1893	.01
154	Sierra Buttes, G	Cal..	2,225,000	122,500	10					1,529,357	Oct.	1892	.18
155	Sierra Nevada, s. G	Nev..	10,000,000	100,000	100	6,411,910	June	1892	.25	102,000	Jan..	1871	1.00
156	Sierra Nevada, s. L	Idaho	1,000,000	1,000,000	1	*				40,000	May..	1889	.02
157	Silent Friend	Colo.	500,000	500,000	1					60,000	Aug..	1891	02½
158	Silver Cord, s. L. G	Colo.	4,500,000	450,000	10					265,000	April	1889	.10
159	Silver King, s	Ariz..	10,000,000	100,000	100	130,000	Nov.	1890	.30	1,950.000	July	1887	.25
160	Silver Mg.of L.V.,s.L	N. M..	500,000	500,000	1					300,000	Dec..	1891	4 05
161	Slide	Colo..	500,000	5,000	100					20,000	Nov..	1891	4.00
162	Small Hopes Con., s	Colo.	5,000,000	250,000	20	*				32,00,000	Nov.	1892	.15
163	Spring Valley, G	Cal..	200,000	200,000	1	50,000	Oct.		.25	50,000	Jan.	1891	.25
164	Standard, G. S	Cal...	10,000,000	100,000	100	100,000	June	89	.50	3,645,000	Dec..	1892	.10
165	Stormont, s	Utah	500,000	500,000	1	*				155,000	Nov	1891	.05
166	St. Joseph, L	Mo..	1,500,000	150,000	10	*				1,974,000	Dec..	1891	.02
167	Swansea, G. S	Colo..	600,000	60,000	10					27,000	Mar.	1892	.10
168	Tabarack, C	Mich..	1,250,000	50,000	25	320,000	Aug.	88	3.00	3,160,000	Dec.	1892	.00
169	Teal & Poe	N. M.	150,000	150,000	1	*				9,000	Nov.	1891	.01½
170	Tombstone, G. S. L	Ariz..	12,500,000	500,000	25	*				1,250,000	April	1882	.10
171	United Verde, C	Ariz.	3,000,000	300,000	10	*				207,500	Jan..	1892	.10
172	Viola Lt., s. L	Idaho	750,000	150,000	5					337,500	Nov.	1888	.37½
173	Ward Con., s	Colo.	2,000,000	200,000	10					20.000	Dec.	1888	.05
174	Woodside, s. L	Utah	100,000	100,000	10					25.000	Oct..	1889	.25
175	W. Y. O. D	Cal..	30,000	15,000	2	22,500	May.	1891	.10	42 ,000	Dec.	1892	.10
176	Yankee Girl, s	Colo.	1,300,000	260,000	5					1,405,000	April	1891	1.50
177	Yellow Jacket, G. S	Nev	12,000,000	120,000	10	5,808,000	Sept	1892	2	2,184,000	Aug.	1891	1.50
178	Yosemite No. 2	Utah.	1,000,000	100,000	10					25,000	Oct..	1891	.05
179	Young America, G	Cal.								175,000	Jan..	1888	1.00

NON-DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares.		Assessments.		
				No.	Par	Total levied.	Date and am't of last	
55	Denver City, s	Colo..	5,000,000	500,00	11	*		
56	Denver Gold, G	Colo..	300,000	60,000	5			
57	Dickens-Custer, s	Idaho	2,100,000	420,000	5			
5	Durango, G	Colo..	500,000	500,000	1	*		
59	Eastern Dev. Co., Lt	N. S..	1,500,000	150,000	10	990,000	Mar.	1886 1.00
60	El Dorado, G	Cal...	1,000,000	250,000	4	*		
61	El Talento, G	U.S.C.	1,000,000	500,000	2			
62	Emma, s	Utah.	625,000	500,000	12?			
63	Emmons, s. L	Colo..	2,000,000	2,000,000	1			
64	Empire, s	Utah.	10,000,000	100,000	100	*		
65	Eureka Tunnel, s. L	Nev...	10,000,000	100,000	100	*		
66	Exchequer, s. G	Nev...	10,000,000	100,000	100	940,000	Jan..	1892 .25
67	Found Treasure, G. S.	Nev...	10,000,000	100,000	100	130,500	Jan..	1892 .50
68	Gogebic L. Syn., L	Wis..	5,600,000	200,000	25	*		
69	Gold Bank, G. S	Colo.	250,000	250,000	1	*		
70	Gold Cup, s	Colo..	500,000	500,000	1	*		
71	Golden Era, s	Mont.	2,000,000	200,000	10	*		
72	Gold Flat, G	Cal...	1,000,000	100,000	10	5,000	Mar..	1892 .05
73	Gold King, g	Colo..	1,650,000	350,000	5			
74	Gold Rock, G	Cal...	1,000,000	500,000	2			
75	Golden FeatherCa., g	Cal...	900,000	180,000	5			
76	Goodshaw, G	Cal...	10,000,000	100,000	100	*		
77	Goodyear G. S. L	Mont.	1,000,000	200,000	5	13,000	Feb..	1892 .01
78	Grand Belt, C	Tex.	12,000,000	120,000	100			
79	Grand Canyon, s	Ariz..	375,000	75,000	5			
80	Grand Duke, s	Colo..	800,000	80,000	10			
81	Gregory Con., G	Mont.	3,000,000	300,000	10			
82	Harlem M. & M. Co., G	Cal...	1,000,000	200,000	5			
83	Hartery Con., G	Cal...	1,000,000	100,000	10	22,000	Oct..	1890 .05
84	Hartshorn, g s. l	S.Dak	1,250,000	250,000	5	8,750	Sept.	1891 .00½
85	Head Cent. & Tr., s. G	Ariz..	10,000,000	100,000	100	16,981	Mar..	1892 .03
86	Hector, G	Cal...	1,500,000	300,000	5	45,000	Jan..	1889 .15
87	Highland, C	Mich..	500,000	25,000	20			
88	Himalaya, g. s l	Utah.	1,800,000	180,000	10	12,800	Oct..	1892 .00½
89	Holywood	Cal...	200,000	100,000	2			
90	Hortense, s	Colo..	2,000,000	200,000	10			
91	Huron, C	Mich..	1,000,000	40,000	25	280,000	May	1887 3.00
92	Idaho, g. s	Idaho	1,250,000	250,000	5			
93	Inez, s. L	Idaho	1,000,000	1,000,000	1			
94	Ingalls, g	Colo..	100,000	20,000	5			
95	Ironton, I	Wis..	1,000,000	40,000	25			
96	Iroquois, C	Mich..	1,250,000	50,000	25			
97	Kentuck Con	Nev..	10,500,000	105,000	00	57,750	July.	1892 .10
98	J. D. Reymert, s	Ariz..	10,000,000	100,000	100			
99	Julia Con., G. S	Nev...	11,000,000	110,000	100	1,463,000	Jan..	1889 .10
100	Justice, g. s. C	Colo.	500,000	500,000	1	*		
101	Lacrosse, G	Colo..	1,000,000	100,000	10	*		
102	La Cumbre, g. s	Mex..	150,000	3,000	50	*		
103	Lee Basin, s	Colo..	5,000,000	500,000	10	*		
104	Little Josephine, s	Colo..	250,000	50,000	5			
105	Lone Star Cons., G.	Cal...	500,000	500,000	1	10,000	April	1892 .00½
106	Lynx Creek, g	Ariz..	237,500	147,500	5			
107	Madeleine, G. s. L	Colo..	750,000	50,000	1	4,500	Feb.	1892 .00½
108	Mammoth Gold, G	Ariz..	245,000	49,000	5	*		
109	Mayflower Gravel, G	Cal...	1,000,000	100,000	10	*		
110	Medora, G	Dak..	250,000	250,000	1	585,00	Mar.	189 .56
111	Merrimac Con., G. S.	Colo..	5,000,000	500,000	10			
112	Mexican, G. S	Nev..	10,000,000	100,000	100	2,917,56	ct..	1892 .50
113	Michigan, g s	Mich..	2,500,000	250,000	25	40,000	Mar..	1892
114	Middle Bar, G	Cal...	400,000	200,000	2	*		
115	Mike & Starr, s. C	Utah.	1,000,000	200,000	5	*		
116	Milwaukee, s	Mont.	500,00	500,000	1	*		
117	Minah Cons	Mont.	1,250,000	250,000	5			
118	Modoc Chief, l s. g.	Idaho	1,000,000	200,000	5	5,000	Jan..	1892 .00½
119	Monitor, G	Colo..	100,000	100,000	1	12,500	May.	1891 .0
120	Montreal, G. S. L	Utah.	750,000	150,000	5	4,500	Feb..	1892 .00½
121	Mountain Ledge, g	Cal...	500,000	100,000	5			
122	Mount McClellan	Colo.	1,500,000	300,000	5	*		
123	Mutual Mg. & Sm	W sh.	100,000	100,000	1			
124	Native, C	Mich..	1,000,000	40,000	25			
125	Neath, G	Colo..	1,000,000	100,000	10			
126	Nelson	Cal...	50,000	10,000	5			
127	Nevada Queen, s	Nev...	10,000,000	100,000	100	200,000	Oct..	1889 .25
128	New Germany, G	N. S..	100,000	100,000	1	*		
129	New Gold Hill	N. C	1,750,000	350,000	5	*		
130	New Pittsburg, s. L	Colo..	2,000,000	200,000	10			
131	New Queen Gold, s	Colo..	800,000	160,000	5			
132	North Standard, G	Cal...	10,000,000	100,000	100	20,000	Nov	
133	Occ dental Con., g. s		10,000,000	100,000	100	245,000	April	1892 .2
134	Oneida Chief, G	Cal...	500,000	125,000	100	*		
135	Oriental & Miller, s	Nev...	10,000,000	400,000	100			
136	Original Keystone, s	Nev..	10,000,000	100,000	100	250,000	Mar..	1892 .10
137	Osceola, G	Nev...	5,000,000	500,000	10	*		
138	Overman, G. S	Nev...	11,520,000	115,200	100	4,001,840	May	1892 .10
139	Park, s	Utah.	2,000,000	200,000	10			
140	Parker, g	N. C..	750,000	180,000				
141	Pay Rock, s	Colo..	1,000,000	200,000	5			
142	Peer, s	Ariz..	10,000,000	100,000	100	190,000	Feb..	1892 .10
143	Peerless, s	Ariz..	10,000,000	100,000	100	405,000	Oct..	1890 .15
144	Pennsylv'a Cons., G	Cal...	5,150,000	515,000	10	36,050	Feb..	1892 .10
145	Phœnix, g	Ariz..	500,000	500,000	1	*		
146	Phœnix Lead, s. L	Colo..	100,000	100,000	1	*		
147	Pilgrim, G	Cal...	600,000	300,000	2	*		
148	**Pioche M. & R., s. G. L.	Utah.	20,000,000	2,000,000	10			
149	Poorman, Ltd., s. L	Idaho	250,000	50,000	5			
150	Potosi, s	Nev...	11,200,000	112,000	100	1,573,000	Mar..	1890 .50
151	Proustite, s	Idaho	250,000	250,000	1	*		
152	Puritan, s. G	Colo..	1,500,000	150,000	10	*		
153	Quincy, C	Colo..	3,000,000	300,000	10			
154	Rainbow, g	S.Dak	1,250,000	250,000	5	4,250	July.	1892 .00½
155	Rappahannock, G. S.		250,000	250,000	1	*		
156	Red Elephant, s	Colo..	500,000	500,000	1	*		
157	Red Mountain, s	Colo..	300,000	60,000	5			
158	Ropes, G. S	Mich..	2,000,000	80,000	25	167,200	Feb.	1891 .50
159	Ruby & Dun., s. L. G.	Nev..	25,300	506	50			
160	Russell, G	N. C..	1,500,000	300,000	5			
161	San.pson, G. S. L	Utah.	10,000,000	100,000	100	288,15	July.	1888 1.00
162	Seal of Nevada, g. s	Nev..	5,000,000	100,000	50	*		
163	Silver Age, s l. g	Colo..	2,000,000	200,000	10	*		
164	Silver Bell, s	Ariz..	850,000	170,000	5			
165	Silver King, s	Cal..	2,000,000	400,000	5			
166	Silver Queen, C	Ariz..	5,000,000	200,000	25	*		
167	Silverton, s	Colo..	300,000	60,000	5			
168	Siskiyou Con., L	Cal...	2,000,000	200,000	10	13,000	May..	1892 .01½
169	South Bulwer, G	Cal...	10,000,000	100,000	100	100,000	May	1891 .2
170	South Hite, g	Cal..	10,000,000	100,000	100	195,000	Jan..	1893 .05
171	South Pacific, g	Cal..		500 00	5			
172	Stanislaus, G	Cal..	2,000,000	200,000	10			
173	St. Kevin, s. G	Colo.	100,000	100,000	1	*		
174	St. Louis & Mex., s	Mex..	,000,000	500,000	10	*		
175	St. Louis & St. Elmo	Colo..	000 000	200,000	10			
176	St. L. & St. Felipe, G. S.	Mex..	,0 ,000	150,000	10			
177	St. L. & Sonora, G. S.	Ariz..	3,000,000	300,000	10	*		
178	Sten.winder, l. s	Idaho	500,000	500,000	1			
179	Sunday Lake, L	Mich..	1,250,000	50,000	25			
180	Sullivan Con., G	Dak..	600,000	200,000	3	*		
181	Sylvanite, s	Colo..	5,000,000	500,000	10	*		
182	Taylor-Plumas, G	Cal...	325,000	65,000	5	3,575	Mar..	1892 .01½
183	Telegraph, g. s	Cal..	325,000	65,000	5	3,575	Mar.	1892 .01½
184	Telegraph, G. S	Mex..	100,000	100,000	1	70,000	Feb..	1892 .10
185	Teresa, G. S	Cal...	1,000,000	200,000	5	10,000	Feb..	1888 .10
186	Tioga Con., G	Nev...	10,00 ,00	100,000	10	295,000	May	1888 .25
187	Tornado Con., G. S.	Nev...	100,000	100,000	1	*		
188	Tuscarora, s	Nev...	10,000,000	500,000	20	385,000	Jan..	1892 25
189	Union Con., G. S	Nev...	10,000,000	100,000	100	370,000	June	1892 25
190	Utah, s	Nev..	10,000,000	100,000	100	245,000	Aug..	1890 .25
191	Ute & Ulay, s. L	Colo..	1,000,000	500,000	2	1,500	Mar..	1892 0015
192	Valley, g	Cal.	575,000	460,000	125			
193	Wall Street, G. S. L	Colo..	500,000	500,000	1			
194	Washington, C	Mich..	1,000,000	40,000	5			
195	West Argentine,	Colo..	750,000	150,000	5			
196	West Granite Mt., s.	Mont.	500,000	100,000	5	*		
197	Whale, s	Mont.	5,000,000	500,000	10	*		
198	Wood River, g	Idaho	2,000,000	200,000	10	3,000	Aug.	1891 .00½
199	Yuma, C. S. G	Ariz..	10,000,000	400,000	2			
200	Zelaya, G. S	.A	5,000,000					

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. * Non-assessable. † This company, as the Western, up to December 10th, 1881, paid $1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid $275,000 in eleven dividends and the Terra $75,000. Previous to the consolidation in August, 1884, the California had paid $31,320,000 in dividends, and the Cons. Virginia $42, 90,000. ** Previous to the consolidation of the Copper Queen with the Atlanta. August, 1885, the Copper Queen had paid $1,350,000 in dividends. ¶ This company paid $190,000 before the reorganization in 1880. ** This company acquired the property of the Raymond & Ely Company which had paid $3,075.000 in dividends. *** Previous to this company's acquiring Northern Belle, that mine declared $2,400.000 in dividends against $425,000 in assessments

COAL, RAILWAY AND OTHER STOCKS.

NAME OF STOCKS.	Feb. 18. H.	Feb. 18. L.	Feb. 20 H.	Feb. 20 L.	Feb. 21. H.	Feb. 21. L.	Feb. 22. H.	Feb. 22. L.	Feb. 23 H.	Feb. 23 L.	Feb. 24 H.	Feb. 24 L.	Sales
Adams Express	.....	.....	160	.....	.. ..	.....	.....	.....	.....	.....	160	....	201
Albany & Susq.	.....	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. B'k Note	.....	.....	.. ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am Coal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Cotton Oil.	49	48	48	45¾	48½	47½	.....	.....	48¾	47	47⅜	46½	29,913
do. pref.	82	.....	81⅞	80¼	82½	82	.....	.....	.....	.....	80¾	80	1,318
Am. Express	.....	.....	118	117	120	119	.....	.....	.....	.....	.....	.....	140
Am. Dist. Tel.	.....	.....	55	.....	55	.....	.....	.....	.....	.....	53	.....	415
Am. Sugar Ref.	125⅜	123	125¾	120½	125¾	123	.....	.....	123	115½	116	111½	532,240
do. pref.	.....	.....	102⅜	101⅜	102¾	.....	.....	.....	102	101	100⅜	99⅜	5,099
Am. T. & C. Co.	.....	.....	89	88	89	88½	.....	.....	89¼	.....	.....	.....	208
Am. Tobacco.	108	.....	107½	103½	108⅛	107⅜	..	.....	107½	107	107	106	2,438
do. pref.	.....	.....	.....	.....	.....	.....	.....	.....	107	.....	.....	.....	215
Atch., T. & S.F.	34	33¾	33½	32⅜	33⅛	33	...	...	33¼	32	32⅛	31⅞	30,702
Atlantic & Pac.	.....	.....	3½	.....	3½	3	.....	.....	3⅛	.....	.....	.....	1,130
Balt. & Ohio.	95⅜	94¾	.....	.....	.....	.....	.....	.....	93⅜	93	.....	.....	945
do pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Balt. & O., S.W.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
do. pfd.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
B., C. R. & N.	.....	.....	.....	.....	62	.....	.....	.....	60	.....	.....	.....	158
Bos. A. L. pfd.	101½	.....	.....	.....	101½	.....	.....	.....	.....	.....	.....	.....	12
Buff. R. P.	35	.....	34	.....	.....	.....	.....	.....	.....	.....	.....	.....	125
do. pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cambria Iron	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Canad'n Pacific	.....	.....	.....	.....	85	.....	.....	.....	83¾	.....	83¾	.....	200
Canada South.	56⅜	56	56	55½	56	55⅜	.....	.....	55½	55	55	.....	3,700
Cen. Iowa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
do. pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Central Pacific	.....	.....	28	.....	27	.....	.....	.....	26½	.....	.....	.....	275
Char., Col. & A.	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
Ches. & Ohio	24¼	23½	23⅞	23½	24⅜	23½	.....	.....	24	23⅛	23½	22⅞	19,278
do. 1st pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
do. 2d pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chic. & Alton.	.....	.....	144½	143	.....	.....	.....	.....	.....	.....	.....	.....	43
do. pfd.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chic., Burl. & Q.	98¾	97⅝	97½	95⅞	97¾	96	.....	.....	96⅝	94¼	95⅝	94	70,285
Chic. & East Ill.	68	.....	.....	.....	66½	.....	.....	.....	.....	.....	.....	.....	200
do. pref.	104	.....	.....	.....	102	.....	.....	.....	.....	.....	.....	.....	133
Chic. Gas Trust.	90⅜	89¼	89⅛	86⅞	89	88¾	.....	.....	88¾	86⅝	87½	85¾	60,956
Chic., Mil.& S.P.	79⅝	78⅜	78⅝	76⅝	78¾	77	.....	.....	77⅜	75¾	76⅝	75	177,258
do. pref.	.....	.....	122⅞	122¼	124	123¼	.....	.....	123	122¼	122¼	.....	3,081
Chic. & N'west.	112⅞	112⅜	112¼	111⅝	112⅜	111⅞	.....	.....	112¼	110¾	111⅝	110¾	11 560
do. pref.	.....	.....	145	.....	145	.....	.....	.....	.....	.....	.....	.....	310
Chic., R.I.& Pac.	84⅞	84⅛	84	82½	84	83⅛	.....	.....	83¼	81⅝	82¾	81⅝	32,543
Chi., S.P., M.&O.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	52⅜	51	5,200
Chi. Stock Yds.	.....	.....	.. ..	.....	.....	.....	.....	.....	100½	100	.....	...	200
do. pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cit. Gas, Bklyn.	.....	.....	.....	.....	.....	.....	.....	.....	108	.....	.....	.....	5
C., C., C.& St. L.	54	.....	54	53¾	54	...	.....	.....	54⅛	52¼	51¾	50½	4,692
do. pref.	.....	.....	.....	.....	.....	.....	.....	.....	93⅜	93¼	.....	.....	35
Clev. & Pitts.	.....	.....	156⅜	.....	.....	.....	.....	.....	.....	.....	.....	.....	32
Col. C. & I.	23	.....	22⅝	21	23¼	.....	.....	.....	22½	22	.....	.....	1,710
Col. Coal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Colorado Fuel.	70	68¾	70	68¾	70¼	69½	.....	.....	69¾	68⅜	.....	.....	5,617
do. pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Col., H V.& Tol.	29¼	.....	28⅝	27⅝	28⅝	.....	.....	.....	28	.....	28⅛	28	2,520
do. pfd	.....	.....	70	69	.....	.....	.....	.....	.....	.....	.....	.....	300
Col. & H. Coal.	20¾	.....	20	.....	19¾	18½	.....	.....	.....	.....	20¼	20	1,725
do. pfd.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Commer. Cable.	.....	.....	.....	.....	180	.....	.....	.....	.....	.....	.....	.....	29
Cons. Coal.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cons Gas.	.....	.....	131½	130	131¾	131½	.....	.....	130	129	130½	...	1,947
Del. & Hud. C.	133⅜	133	131¾	129½	130⅛	128	.....	.....	128	126¾	127¼	124	12,952
Del., L. & West.	151⅞	149¾	151¼	149¾	149	145¼	.....	.....	146	142¾	147	142	60,108
Des. M. & Ft. D.	8⅜	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	200
do. pref.	.....	.....	.....	.....	22	.....	.....	.....	.....	.....	.....	.....	100
Denv. & Rio G.	17	.....	.....	.....	16	.....	.....	.....	15½	.....	.....	.....	310
do pref	55	.....	54¾	53¾	54	53⅜	.....	.....	53½	52¾	52¾	51⅞	3,912
Dls. & C.F. Tr'st	38¼	37	37½	36	38⅜	37	.....	.....	37⅞	37	37	35	41,790
do. ex-div.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dul., S. S. & A.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
do. pref	.....	.....	.....	.....	28	.....	.....	.....	28	.....	.....	.....	400
E. T., Va. & Ga	.....	.....	5¼	.....	4½	.....	.....	.....	.....	.....	.....	.....	.....
do 1st pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
do. 2d pref.	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
Edison Ill. Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	870
Edison E. L. Co.	125	.....	125½	124¼	124½	123	.....	.....	123	.....	.....	.....	870
Edison Gen. El.	110⅛	108¼	109	108	108¾	107	...	.....	108⅛	107	107¾	106⅜	16,981
do. pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Erie & West.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Evans. & T. H.	151	150	.. ..	.....	150	.....	.....	.....	148	.....	147	.....	350
Flint & P. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
do. pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gt. Nor. pref.	140	.....	142	141½	.....	.....	.....	.....	.....	.....	.....	.....	500
Green B. & W.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
do. t. r.	12½	12	11¾	.....	11¾	11¼	.....	.....	11½	.....	11½	.....	2,440
G. B. & W., pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
do. t. r.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Houston & Tex.	.....	.....	.....	.....	.....	.....	.....	.....	6⅞	.....	.....	.....	100
Hunt. & B.Top.	35	.....	34	.....	34	33½	.....	.....	35¼	34⅜	.....	.....	2,105
do pref.	.....	.....	50	.....	50	49	.....	.....	50¾	49⅞	.....	.....	2,594
Ill. Cent.	100	.....	99¾	99¼	99¾	99⅝	.....	.....	99¾	99½	99⅝	99½	1,760
Int. Cond.& Ins	.....	.....	.....	.....	.....	.....	.....	.....	64¾	.....	.....	.....	100
Iowa Central.	.....	.....	8	.....	8½	.....	.....	.....	.....	.....	.....	.....	725
do. pref.	.....	.....	30	.....	.....	.....	.....	.....	.....	.....	30	.....	110
Kan'wha&Mich	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Keokuk, D. M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Laclede Gas.	23¾	.....	22	.....	.....	.....	.....	.....	22	.....	21	20¼	1,300
do. pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lake Erie&Wes	.....	.....	22⅞	22½	.....	.....	.....	.....	22½	.....	22½	22	1,200
do. pref.	.....	.....	77½	76¾	77⅞	77	.....	.....	77	.....	76½	.....	1,300
Lake Shore	128¾	127½	128⅝	127½	128⅝	.....	.....	.....	128	127⅛	127¾	127⅛	2,577
Lehigh C. & N.	53½	53	51	.....	52¾	51	.....	.....	52¼	51⅝	.....	.....	1,229
Lehigh Valley.	50	54⅜	53	44¼	49	47½	.....	.....	50	48	.....	.....	51,546
Long Island.	.....	.....	109½	.....	109	.....	.....	.....	107½	107	.....	.....	470
do. ex-div.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
L. Erie & St. L.	23½	.....	23	.....	.....	.....	.....	.....	.....	.....	.....	.....	200
do. pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Louisv'le & N'sh	76	75¼	74⅞	74⅛	75¼	74½	.....	.....	74⅛	73½	74⅛	73	22,930
Louis., E. & St. L	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
do pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
L., N. A. & C.	.....	.....	24¼	23¾	24	.....	.....	.....	23¾	23	23	23¼	2,400
L., St. L. & T.	23¼	22½	23⅜	23⅛	23¼	.....	.....	.....	23	22⅝	.....	.....	1,400
Mahoning Coal.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
do. pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
ManhattanCon.	163½	159	160	157	160	158¼	.....	.....	159	156¾	157¼	156	13,885
Maryland Coal.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Memphis & Char.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mexican Cent	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Michigan Cent.	106	.....	.. ..	.....	.....	.....	.....	.....	105	.....	104¾	106½	115
Minnesota Iron.	.....	.....	.....	.....	66½	.....	.....	.....	.....	.....	.....	.....	145
do pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Minn. & St. L.	.....	.....	.....	.....	.....	.....	.....	.....	16½	.....	.....	.....	200
do pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M., L., S., & W.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
do. pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M., Kan. & Tex.	.....	.....	24¾	24½	25	24¼	.....	.....	14¼	13¾	.....	.....	350
do. pref.	.....	.....	.....	.....	.....	.....	.....	.....	24⅞	.....	.....	.....	1,550
Missouri Pac.	55⅞	55¼	55½	55	55⅝	55⅜	.....	.....	55⅜	54¾	55¼	54⅜	15,387
Mobile & Ohio.	37	33	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,710
Morris & Essex.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nat. Cord. Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
do. pref	.....	.....	113¾	...	112½	111¼	.....	.....	112	111¼	111	.....	1,094
do. New	66	63¾	66⅛	64⅜	66⅜	65¼	.....	.....	65½	63⅝	62	58½	72,097
Nat. Lead Co.	43½	43	43¾	41⅜	43¾	42¼	.....	.....	42⅜	39⅞	40¼	38½	31,529
do. pref	92½	.....	92	91¾	93⅛	92⅜	.....	.....	92½	90⅝	89½	88	7,583
Nat. Linseed Oil	36½	.....	.....	.....	38	37⅝	.....	.....	37¾	36¾	.....	.....	2,260
Nat. Starch	22¾	.....	23	22	.....	.....	.....	.....	23⅛	23	.....	.....	710
do 1st pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
do. 2d pref	84	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10
New Cent. Coal.	9½	.....	.....	.....	.....	.....	.....	.....	9½	.....	.....	.....	200
N. C. & St. L.	.....	.....	.....	.....	88	.....	.....	.....	.....	.....	.....	.....	100
N. J. Central.	121¾	126	124	119	121	119	.....	.....	119⅝	118¾	119¾	118	3,012
N. Y. Central.	109½	.....	108¾	108⅛	108¾	.....	.....	.....	108¾	108⅛	108¾	.....	3,894

COAL, RAILWAY AND OTHER STOCKS.

NAME OF STOCKS.	Feb. 18. H.	Feb. 18. L.	Feb. 20. H.	Feb. 20. L.	Feb. 21. H.	Feb. 21. L.	Feb. 22. H.	Feb. 22. L.	Feb. 23. H.	Feb. 23. L.	Feb. 24. H.	Feb. 24. L.	SALES.
N.Y.,Chi. & St.L.	17¼	.....	17⅜	....	.....	.....	.....	.....	17	16⅞	.....	.....	960
do. 1st pref.	.....	...	.....	.....	.....	.....	.....	.....	68	.....	.....	.....	150
do. 2d pref.	.....	.....	.....	.....	.....	.....	.....	.....	34½	.....	32½	.....	100
N. Y., L. & W.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N. Y., L. E.& W.	24¾	24	24	23⅝	23⅝	23	.....	.....	23¼	22⅞	.....	.....	35,545
do. pref.	.....	.....	53	.....	52½	52¼	.....	.....	52¾	52⅛	.....	.....	970
N.Y., N.H.& H'rt	259	.....	253½	.....	.....	.....	.....	.....	.....	.....	.....	.....	42
N. Y. & N. Eng.	44⅞	44	40⅝	34½	41⅜	38⅛	.....	.....	40⅜	37	36	29⅞	289,390
N.Y., Susq. & W.	18⅞	18⅛	18¼	18	18	17⅜	.....	.....	17½	16½	16¾	15¾	6,485
do. pref.	69¼	.....	68½	67	67	65	.....	.....	65¾	65	64½	64	3,390
N.Y. & North.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
do pref.	30½	.....	30	29	31	.....	.....	.....	30½	.....	.....	.....	760
Norfolk South.	.....	.....	.....	.....	.....	.....	.....	.....	9	.....	.....	.....	.....
N. & West.	.....	.....	35⅝	.....	.....	.....	.....	.....	.....	.....	.....	.....	225
do. pref.	.....	.....	37	36⅞	.....	.....	.....	.....	.....	.....	.....	.....	40
Nor. Amer. Co.	10¼	10	9⅝	9⅝	9⅝	9⅝	.....	.....	9¾	9½	9⅝	9	6,748
North. Pacific.	17⅝	17¼	15¾	14¾	15⅝	15	.....	.....	16¼	15½	15½	15	9 730
do. pref.	48¾	48	45½	43	43⅝	43½	.....	.....	43⅜	40¾	40⅜	38⅜	109,744
Ohio & Miss.	23	.....	22½	.....	23	.....	.....	.....	.....	.....	.....	.....	600
Ohio Southern.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ontario & West.	18¼	18	18	17¾	18	17¾	.....	.....	17⅝	17½	17⅝	17¼	5,641
Oregon imp.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ore. R. & N.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ore., St. L. & U. N.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pacific Mail.	26¾	26	.....	.....	25⅜	.....	.....	.....	25	.....	24⅜	.....	800
Penn. R. R.	54¾	54⅝	54¾	54	54½	54⅛	.....	.....	54⅜	54	.....	.....	4,543
Peoria, Dec. & Ev. R.	.....	.....	17	16¾	16⅞	16⅝	.....	.....	16⅝	.....	16⅝	16½	1,370
Phil. & Reading.	40½	36⅜	36	28	31	28¾	.....	.....	29¼	27¾	29	27¾	1,995,773
Pitts., F.W. & C.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pitts. & W., prf.	35	.....	34½	.....	34	.....	.....	.....	35	.....	35	34	800
P., C., C. & St. L.	.....	.....	.....	.....	.....	.....	.....	.....	19	.....	19	.....	155
do. pref.	.....	.....	51½	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Pullman P. C. Co.	.....	.....	196	.....	194¾	194½	.....	.....	193	.....	193½	193	1 218
Rens. & Sara.	.....	.....	178	.....	.....	.....	.....	.....	.....	.....	.....	.....	50
Rich. & W. P.	99¼	.....	99¼	99⅛	10½	.....	.....	.....	10¼	9⅝	9⅝	9½	23,190
do. pref.	.....	.....	35	.....	39⅞	37	.....	.....	40	38	.....	.....	1,660
Rio Grande & W	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
do. pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rome, W & O.	111¼	.....	.....	.....	111½	.....	.....	.....	.....	.....	.....	.....	100
So. Cotton Oil.	.....	.....	53¾	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
So. Pacific.	32	31½	31⅞	31¼	32	31⅝	.....	.....	32	31½	31¾	31	3,300
St. L. & San. Fe.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
do. pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. L. & Southw.	.....	.....	.....	.....	.....	.....	.....	.....	.....	63¾	.....	.....	100
do. pref.	13	.....	13	.....	13	12½	.....	.....	.....	.....	.....	.....	680
St. P. & Duluth.	.....	.....	44	.....	43⅜	42½	.....	.....	43	.....	.....	.....	500
do. pref.	.....	.....	105	103	.....	.....	.....	.....	.....	.....	.....	.....	325
St. Paul, M.& M.	.....	.....	.....	.....	116	.....	.....	.....	.....	.....	.....	.....	255
St.Paul & Omaha	55¼	54⅛	54	52½	54¼	53½	.....	.....	53¾	52½	52½	51	17,685
do. pref.	.....	.....	118½	118	119	.....	.....	.....	.....	.....	.....	.....	4 0
Tenn. C. & I.	35⅜	35	35	33¾	34½	34⅜	.....	.....	34	32⅜	32¾	29	13,210
do. pref.	102	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
Tol. & O. Cent.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
do. pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Texas Pacific.	9⅜	.....	9¾	9½	9¾	9⅝	.....	.....	9½	9⅜	9⅜	9	3,300
do. Land Tr	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tol., A.A.&N.M.	38¼	.....	38	37¾	38¼	.....	.....	.....	38	37¾	37½	.....	2,762
Tol., St.L.& K.C.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
do. pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Union Pacific	39¾	39	39¼	38¼	39½	38	.....	.....	38	37	37½	36⅞	83,430
do. Den. & G.	.....	.....	15	.....	.....	.....	.....	.....	14	.....	.....	.....	520
U. S. Express.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
U. S. Rubber.	44	43½	44½	44	44½	44¼	.....	.....	44	.....	44	.....	1,645
do. pref.	.....	.....	92½	.....	94½	.....	.....	.....	94	.....	.....	.....	166
Wab., St.L.& P.	12¼	.....	12⅝	12	12¼	12¼	.....	.....	12	.....	12¼	11¾	6,235
do. pref.	23½	25¼	25	25¾	25	24¾	.....	.....	24½	23½	23¾	22⅞	10,600
Wells, Fargo Ex.	.....	.....	146	.....	.....	.....	.....	.....	.....	.....	.....	.....	20
Western Union.	97½	96½	96½	95½	96¼	95½	.....	.....	96⅝	95⅜	95⅞	94¼	34,977
do. ex-div.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wheel. & L. E.	21⅜	.....	20	.....	19½	19⅜	.....	.....	19	.....	19	.....	586
do. pref.	64	61⅝	62	61⅝	62½	.....	.....	.....	61⅝	61½	.....	.....	1,114
Wisconsin Cent.	.....	.....	.....	.....	13	.....	.....	.....	13	12⅜	13½	12⅜	500

Total shares sold, 3,956,234.

San Francisco, Cal.

NAMES OF STOCKS.	CLOSING QUOTATIONS. Feb. 17.	Feb. 18.	Feb. 20.	Feb. 21.	Feb. 22.	Feb. 23.
Alpha	.....	.....	.....	.....	.....	.....
Alta	.15	.15	.15	.15	.....	.15
Belcher.	.75	.75	.75	.75	.....	.80
Belle Isle.	.....	.....	.....	.....	.....	.....
B. & Belch	1.65	1.60	1.70	1.65	.....	1.75
Bodie	.05	.05	.05	.05	.....	.05
Bulwer	.10	.10	.10	.10	.....	.15
Challar	.....	.55	.55	.55	.....	.55
Com'w'lth	.....	.....	.....	.....	.....	.....
Con.C.&V.	2.45	2.35	2.65	2.85	.....	2.90
Con. Pac.	.....	.....	.....	.....	.....	.....
Crown Pt.	.60	.55	.55	.60	.....	.50
Del Monte	.....	.....	.....	.....	.....	.....
E'rekaCon	.....	.....	.....	.....	.....	.....
G'ld & C'y	.90	.90	.95	.95	.....	.95
Hale & N.	1.35	1.25	1.30	1.30	.....	1.30
M. White.	.....	.....	.....	.....	.....	.....
Mexican.	1.75	1